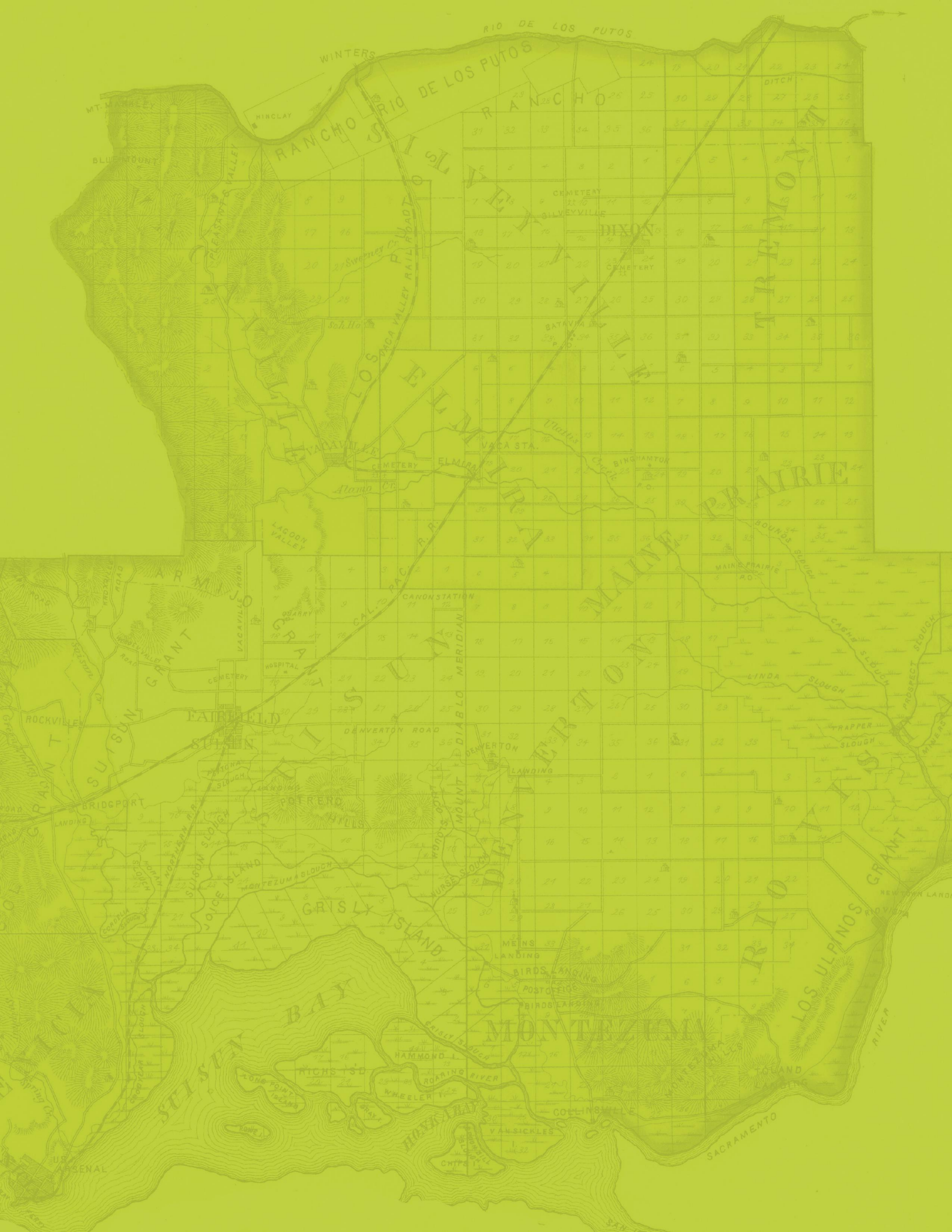
AECOM

# County of Solano
# Climate Action Plan

*Adopted by the Board of Supervisors June 7, 2011*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PRAIRIE
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LANDING
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CREEK

# Solano County Climate Action Plan

**ADOPTED BY THE BOARD OF SUPERVISORS**
**JUNE 7, 2011**

## COUNTY STAFF

Mike Yankovich.....Planning Program Manager
Matt Walsh ..... Principal Planner

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Kelly Rhoads-Poston ..... District 3

## CONSULTANTS TO THE COUNTY

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# Acknowledgements


## Solano County Climate Action Focus Group

| | |
|---|---|
| Mike Amman | Solano Economic Development Corporation |
| Bruce Brazelton | Agricultural Advisory Committee (AAC), Farm Bureau (orchards/field crops) |
| Moira Burke | AAC (organics) |
| Jeff Dittmer | AAC (cattle) |
| James Dunbar | Potrero Hills Landfill |
| Leslie Fay | Fairfield-Suisun Chamber of Commerce |
| Ozzie Hilton | City of Vacaville Traffic Engineering |
| Steve Lessler | The Lessler Group, Professional Business Services |
| Russ Lester | Dixon Ridge Farms, AAC (orchards/processing) |
| Brian McLean | City of Vacaville City Fleet and Transit Manager |
| Robert Macauley | Solano Transportation Authority, Director of Planning |
| Ben Wallace | Solano Land Trust |
| David White | City of Fairfield (Public Works), Sustainability Initiatives |
| Bonnie Hays | enXco |
| Mike Marcus | City of Benicia (Sustainability Planner) |
| Al Medvitz | AAC (sheep) |

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# CLIMATE CHANGE AND SOLANO COUNTY

The County of Solano (County) has developed this Climate Action Plan (CAP) to address climate change and reduce the community's greenhouse gas (GHG) emissions at the local level. Although climate change is a global problem, many strategies to both adapt to a changing climate and reduce harmful GHG emissions are best enacted at the local level. This plan recommends 31 measures and 94 implementing actions that the community can take to reduce both emissions and communitywide contributions to global climate change.

*Protecting our Climate from "becoming less predictable" begins at the local level. By establishing a greenhouse gas reduction target, Solano County has begun the path of reducing emissions while creating new economic efficiencies and opportunities.*

## INTRODUCTION: CLIMATE PROTECTION, ADAPTATION, AND COMMUNITY BENEFITS

In the 2008 General Plan, Solano County recognized the threat of global climate change and is now taking local action to reduce communitywide GHG emissions and reduce the likelihood of negative climate change effects on the county. The General Plan requires the County to develop this Climate Action Plan and an accompanying Sea Level Rise Strategic Program. Specifically, General Plan Program HS-I.73 requires the development and adoption of the CAP by 2010.

As required by the General Plan, Solano County has completed an emissions inventory for the year 2005. This inventory addresses both municipal emissions resulting from County government activities and communitywide emissions across numerous sectors of economic activity occurring within the unincorporated county.

The County is also establishing a communitywide GHG emissions reduction goal of 20 percent below 2005 levels by 2020 within the CAP, which exceeds guidance provided in the Scoping Plan and Bay Area Air Quality Management District (BAAQMD) California Environmental Quality Act (CEQA) Guidelines. In combination with statewide reductions, it is possible for the County to achieve and surpass this target, resulting in a GHG emissions level of approximately 709,270 MT $CO_2e$ in 2020, or a reduction of 206,880 MT $CO_2e$ below 2020 business-as-usual projections. To achieve this goal, the CAP recommends measures and actions that the County can take to reduce emissions, in collaboration with other institutions. The CAP

addresses both municipal and communitywide emissions for the unincorporated County.

The General Plan contains a broad spectrum of policies and implementation programs addressing climate change. Where applicable, these have been carried forward and are referenced within recommended CAP measures.

***Powered by Wind***

*Solano County benefits from some of the strongest inland winds in California. The county is also located at the center of the state's existing transmission network, unlike other prime locations for wind turbines. Over the years, several wind facilities have been developed, with more in the planning stages. In 2009, both the Montezuma Wind Project and a wind turbine project at Anheuser-Busch's Fairfield Brewery received development approvals. The Montezuma Wind Project is anticipated to include 16 to 23 turbines, and the Anheuser-Busch project in Fairfield will consist of a 400-foot wind turbine that should generate 15 percent of the facility's annual energy use. In addition, the Solano Wind Facility near Rio Vista is seeking approval to expand operations beyond its current 102 megawatt generation capacity.*

*SEDC, NOV 2009*

With large areas of the unincorporated county dedicated to agricultural and industrial uses, reducing GHG emissions provides challenges, especially within current economic conditions, as well as opportunities and community benefits unique to Solano County. Strengthening local agriculture and enhancing agriculture's connections to regional markets increases Solano County's resilience in less certain economic times by establishing more local distribution networks and reducing the amount of fuel necessary to transport farm goods. Associated community benefits include better air quality due to reduced emissions and more efficient technologies, and healthy community benefits from less smog and greater exercise opportunities.

Solano County has unique renewable local energy generation potential. The county benefits from some of the strongest inland winds in California, is well-suited for solar energy generation, has geothermal resources that have become more valuable with new technologies, and is already increasing its capacity to develop biofuels and convert biomass to energy[i]. Although smaller in size, clean energy in Solano County is growing at a much faster rate than carbon-based energy, creating jobs and new business opportunities.

The Climate Action Plan is an emissions reduction roadmap for unincorporated Solano County. The plan outlines action opportunities and ways to be efficient with our resources, creating *win-win* conditions along the way. However, the County can't implement the plan alone; support from and collaboration among everyone in the community is welcome and necessary to ultimately achieve meaningful, prosperous and significant emissions reductions and community benefits.

## CLIMATE SCIENCE OVERVIEW: POTENTIAL CLIMATE CHANGE EFFECTS IN SOLANO COUNTY

Climate change refers to a change in the state of the climate that persists for an extended period, due to natural processes or human-caused changes. According to the United Nations Intergovernmental Panel on Climate Change[ii], the scientific authority on climate change, certain findings are accepted by the scientific community:

- GHGs such as carbon dioxide ($CO_2$), when introduced to the atmosphere, have a warming effect on the earth;
- Human activities have increased the levels of GHGs in the atmosphere since pre-industrial times;
- The global climate has warmed by an average of 1.0–1.7 degrees Fahrenheit from 1906 to 2005; average snow cover and glacial ice have decreased measurably worldwide; and sea levels have risen between four and 10 inches since 1900; and
- A continued increase in GHG emissions, and an associated temperature rise, are likely to accelerate the rate of climate change, producing further effects.

GHGs are gases that trap heat in the atmosphere. The primary contributor is $CO_2$, but GHGs also include methane ($CH_4$), nitrous oxide ($N_2O$), and fluorinated gases. The latter gases have even higher global warming potential (GWP). GWP is the ability of a GHG to trap heat in the atmosphere relative to an equal amount of $CO_2$, which assumes a GWP value of one. $CO_2$, though the most prevalent GHG, is the least powerful. By comparison, methane is 23 times stronger over a hundred year period. Emissions described in this report are expressed as carbon dioxide equivalent ($CO_2e$) emissions.

Human activities that cause GHG emissions include burning, manufacturing, and transportation-related combustion of fossil fuels. Livestock and solid waste emissions also contribute to increasing GHGs. Climate change effects include increased global average temperature, subsequent altered precipitation patterns, thermal expansion of the ocean, and reduced extent of polar and global sea ice.

In Solano County, these changes translate to sea level rise with possible increases in coastal flooding, saltwater intrusion, water and energy supply shortages, and increased wildfire risk. Global average temperature rises and indirect effects associated with climate change increase the likelihood for distribution of diseases and other public health problems; increased occurrence and severity of flooding, storm, and wildfire events; habitat loss and species endangerment; and declining agricultural production. Particularly, if GHG emissions are not reduced globally, the effects of climate change on Solano County are likely to be:

- Up to 2.5 times more critical dry years
- Sea level rise inundation of shoreline areas

- Loss of habitat for sensitive species
- Up to 30% higher building energy use
- Increased irrigation demand from agriculture
- Changes to crop types grown in the county

Responding to climate change requires a two-pronged approach. On one hand, the County must adapt to change and prepare for the foreseeable effects of global warming that is already occurring and, on the other hand, the County must coordinate with agencies, residents, and businesses to modify behavior to decrease the countywide contribution to greenhouse gas emissions and associated impacts on the climate.

## STATE AND LOCAL LEADERSHIP

Between 1990 and 2004, California's annual GHG emissions increased 11% from 427 million metric tons (MMT) to 474 MMT. If emissions continue to increase at these business-as-usual rates, statewide emissions are expected to increase to approximately 600 MMT by 2020, a 40% increase above 1990 levels. In order for California to participate effectively in global efforts to avoid dangerous climate change, statewide GHG emissions need to be reduced to at least 1990 levels by 2020 ,and 80% below 1990 levels by 2050.

California has adopted a wide variety of regulations aimed at reducing the state's GHG emissions. While State actions alone will not stop global warming, adopting and implementing this legislation demonstrates California's leadership in addressing this critical challenge. Key legislation pertaining to California's reduction targets is described below.

### ASSEMBLY BILL 32 (2006)

The California Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32) was enacted by the state legislature to address the threat global warming poses to the state's "economic well-being, public health, natural resources, and the environment." The Act directs the California Air Resources Board (ARB) to "adopt a statewide greenhouse gas emissions limit equivalent to the statewide greenhouse gas emissions levels in 1990 to be achieved by 2020." This requires maintaining an inventory of emission levels as well as taking action to decrease statewide emissions to 1990 levels.

### CLIMATE CHANGE SCOPING PLAN

The Climate Change Scoping Plan was approved by ARB in December 2008 and outlines the State's plan to achieve the emissions reductions required in AB 32. The Scoping Plan contains the primary strategies California will implement to achieve a reduction of 169 MMT $CO_2e$, or approximately 28% from the state's projected 2020 emission levels.

### EXECUTIVE ORDER S-3-05

Executive Order S-3-05 (EO-S-3-05) recognizes California's vulnerability to reduced snowpack in the Sierra Nevada Mountains, exacerbation of air quality problems, and potential sea level rise due to a changing climate. To address these concerns, the executive order established targets to reduce GHG emissions to 2000 levels by 2010, to 1990 levels by 2020, and to 80% below 1990 levels by 2050.

## Additional California Climate Change Legislation

### Assembly Bill 1493 (2002)

AB 1493 requires ARB to develop and adopt regulations to reduce GHG emissions from passenger vehicles, light-duty trucks, and other non-commercial vehicles for personal transportation. In 2004, ARB approved amendments to the California Code of Regulations adding GHG emissions standards to California's existing standards for motor vehicle emissions.

### Assembly Bill 811 (2008)

AB 811 helps finance the upfront costs of solar and other energy efficiency improvements that are permanent fixtures to a property. AB 811 authorizes cities and counties to establish assessment districts in order to provide loans to property owners with long-term repayments added to their annual property tax bills.

### Executive Order S-1-07 (2007)

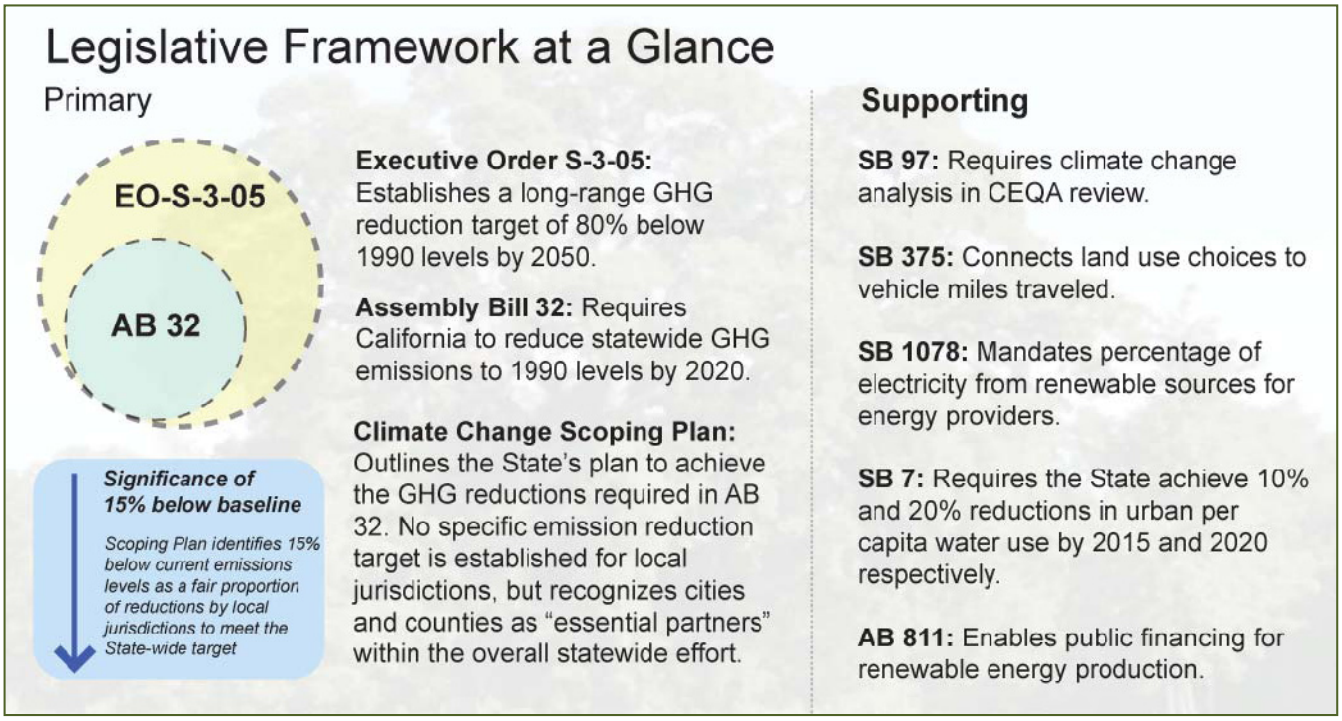
EO-S-1-07 establishes a Low-Carbon Fuel Standard to reduce the carbon intensity of transportation fuels sold in California by a minimum of 10% by 2020.

### Senate Bill 7 (2009)

SB 7 requires the state to achieve a 20% reduction in urban per capita water use by December 31, 2020. The state is required to make incremental progress towards this goal by reducing per capita water use by at least 10% on or before December 31, 2015. SB 7 requires each urban retail water supplier to develop both long-term urban water use targets and an interim urban water use target. SB 7 also creates a framework for future planning and actions for urban and agricultural users to reduce per capita water consumption 20% by 2020.

### Senate Bill 375 (2008)

SB 375 aligns regional transportation planning efforts, regional GHG reduction targets, and affordable housing allocations. Metropolitan Planning Organizations (MPOs) are required to


Legislative Framework at a Glance
Primary
EO-S-3-05
AB 32
Significance of 15% below baseline
Scoping Plan identifies 15% below current emissions levels as a fair proportion of reductions by local jurisdictions to meet the State-wide target
Executive Order S-3-05: Establishes a long-range GHG reduction target of 80% below 1990 levels by 2050.
Assembly Bill 32: Requires California to reduce statewide GHG emissions to 1990 levels by 2020.
Climate Change Scoping Plan: Outlines the State's plan to achieve the GHG reductions required in AB 32. No specific emission reduction target is established for local jurisdictions, but recognizes cities and counties as "essential partners" within the overall statewide effort.
Supporting
SB 97: Requires climate change analysis in CEQA review.
SB 375: Connects land use choices to vehicle miles traveled.
SB 1078: Mandates percentage of electricity from renewable sources for energy providers.
SB 7: Requires the State achieve 10% and 20% reductions in urban per capita water use by 2015 and 2020 respectively.
AB 811: Enables public financing for renewable energy production.

adopt a Sustainable Communities Strategy (SCS), which allocates land uses in the MPO's Regional Transportation Plan. Qualified projects consistent with an approved SCS or Alternative Planning Strategy and categorized as "transit priority projects" receive incentives under new CEQA provisions.

### Senate Bill 1078 (2002) and 107 (2006) and Executive Order S-14-08

SB 1078 requires retail sellers of electricity to provide at least 20% of their supply from renewable sources by 2017. SB 107 changed the target date to 2010. Executive Order S-14-08 expands the Renewable Energy Standard to 33% renewable power by 2020.

### Senate Bill 407 (2009)

SB 407 establishes requirements for replacing plumbing fixtures that are not water conserving by 2017 in residential and by 2019 in commercial real property which was built and available for use on or before January 1, 1994. The bill also requires water-conserving plumbing fixture replacements for all building alterations or improvements to single-family residential real property by January 1, 2014 as a condition for issuance of a certificate of final completion and occupancy or final permit approval by the local building department.

### Senate Bill 97 (2007)

SB 97 acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. The California Resources Agency is required to certify and adopt guidelines for mitigating GHG emissions or the effects of GHG emissions, as required by CEQA. The CEQA Guidelines were amended in March 2010 to incorporate these provisions.

### Senate Bill 1368 (2006)

SB 1368 requires the California Public Utilities Commission (PUC) to establish a GHG emission performance standard for baseload generation from investor-owned utilities, and requires the California Energy Commission (CEC) to establish a similar standard for local publicly owned utilities. The legislation further requires that all electricity provided to California must be generated in plants that meet standards set by the PUC and CEC.

### Executive Order S-13-08 (2008)

EO-S-13-08 directs the Governor's Office of Planning and Research, in cooperation with the California Resources Agency (CRA), to provide land use planning guidance related to sea level rise and other climate change effects. The order also directed CRA to develop a State Climate Adaptation Strategy and to convene an independent panel to complete the first California Sea Level Rise Assessment Report.

## Air Quality Management Districts

Solano County is situated on the boundary of two air basins, each of which is under the jurisdiction of a different air quality management district. The southwestern portion of Solano County is located in the San Francisco Bay Area Air Basin (SFBAAB), and is managed by the Bay Area Air Quality Management District (BAAQMD). The northeastern portion of Solano County lies within the Sacramento Valley Air Basin (SVAB), and is managed by the Yolo-Solano Air Quality Management District (YSAQMD). Both districts prepare plans and programs to attain ambient air quality standards, adopt and enforce rules and regulations, and issue permits for stationary source polluters.

### Bay Area Air Quality Management District

In June 2010, BAAQMD adopted CEQA air quality thresholds of significance for use within its jurisdiction. The overall goal of this effort was to develop CEQA significance criteria that ensure that future development implements appropriate and feasible emission reduction measures to mitigate significant air quality and climate change impacts.

BAAQMD has adopted a GHG threshold of 1,100 MT $CO_2e$ per year for development projects. Projects with emissions greater than the proposed threshold would be required to mitigate to the proposed threshold level or reduce project emissions by a percentage deemed feasible by the lead agency. BAAQMD's approach is to identify the emissions level for which a project would not be expected to substantially conflict with existing California legislation adopted to reduce statewide GHG emissions. If a project would generate GHG emissions above the threshold level, it would be considered to contribute substantially to a cumulative impact and would be considered significant.

Alternatively, a local government may prepare a qualified GHG Reduction Strategy that is consistent with AB 32 goals. BAAQMD encourages such planning efforts and recognizes that careful early planning by local agencies is invaluable to achieving the state's GHG reduction goals. If a project is consistent with an adopted qualified GHG Reduction Strategy that addresses the project's GHG emissions, it can be presumed that the project will not have significant GHG emissions. This CAP is a qualified GHG Reduction Strategy. Please refer to Appendix D for discussion regarding how the CAP meets BAAQMD qualification standards.

### Yolo-Solano Air Quality Management District

YSAQMD regulates, permits, and inspects stationary sources of air pollution. Among these sources are factories, power plants, gasoline stations, auto body shops and dry cleaners. While the State is responsible for controlling actual tailpipe emissions from vehicular sources, YSAQMD is required to implement transportation control measures. These measures are designed to reduce the number of cars on the road and promote the use of cleaner fuels and vehicles. YSAQMD also funds a number of important public and private agency projects that provide innovative approaches to reducing pollution.

YSAQMD's climate protection program includes the integration of climate protection activities into existing programs. YSAQMD is continually seeking ways to integrate climate protection into current functions, including grant programs, CEQA review, regulations, inventory development, and outreach. In addition, YSAQMD's climate protection program emphasizes collaboration with ongoing climate protection efforts at the local and State level, as well as public education and outreach and technical assistance to cities and counties.

## SOLANO COUNTY'S LEADERSHIP

State and local governments will play a critical role in addressing this important issue. California's climate change legislation has generally been interpreted to apply to stationary sources of GHG emissions. However, the County believes that in order to achieve the emission reductions mandated in AB 32, each sector must do its fair share to reduce total emissions, and local action is needed to manage and measure activity within each sector as it relates to land use planning.

Solano County has adopted numerous policies, programs, and incentives to assist the community in preserving the environment. Existing County programs and policies relevant to reducing communitywide GHG emissions include the following:

- Commuter Incentives
- Safe Routes to Schools Program
- County Fleet Fuel Efficiencies
- Solano County Green Building Program
- Economic summits with focus on expanding green energy
- Bay Area Green Business Program
- Recycling Guide
- Several Waste Diversion Programs and Incentives
- Biosolids to Energy Project

Recent accomplishments and programs that have a positive effect on reducing the County's GHG's are described in more detail in Chapters 2 and 3.

## Individual Actions

To achieve Solano County's GHG reduction target, every resident and business needs to participate. Ultimately, the community's GHG emissions are the sum of individual actions and choices. To achieve the desired emission reductions, we all must understand our personal ability to affect change.

Climate change is often framed in terms of global treaties or technological advances, but a person's everyday actions are just as important in creating a solution.

*You are part of the solution if you decide to*

- buy locally produced food;
- compost;
- walk, bike, or take public transit as an alternative to driving;
- buy energy efficient appliances;
- insulate your home;
- replace incandescent light bulbs with compact fluorescent light (CFL) or Light-Emitting Diode (LED) technologies;
- air-dry your dishes and clothes;
- use the cold laundry cycle;
- take short(er) showers;
- adjust your thermostat to a higher temperature in the summer and a lower temperature in the winter;
- rely on natural light and air flow for lighting and cooling; and
- plant one or more climate-appropriate trees to shade your house, yard and property.

## Climate Action Plan Focus Group

Solano County began work on the CAP in 2009, with a two-fold intent: to determine the quantity of emissions to be reduced by creating an emissions inventory and projections, and by developing reduction measures in collaboration with a focus group comprised of representatives of the different emission sectors (Agriculture, Energy, Transportation & Land Use, Waste and Water).The Focus Group members were selected from a varied group of community representatives and invited to attend three meetings related to the Climate Action Plan. The group was dedicated, participated actively in the discussion and the County received valuable input. In particular, the agricultural community offered initial reduction ideas, GHG analysis, and preliminary measures and actions.

The Focus Group met three times during the course of the CAP preparation. At the first meeting in February 2010, preliminary inventory results and climate action ideas for each sector were discussed with the focus group. Comments received at this meeting were incorporated within development of preliminary measures. Inventory and projection results and preliminary measures were then

presented and discussed at the second focus group meeting in March 2010. Based on the feedback received, the preliminary measures were refined and actions and a cost-benefit analysis were developed. These results were shared with the focus group in May 2010. Feedback received at this meeting was integrated into the development of the draft CAP.

## Presentations to the Planning Commission and Board of Supervisors

In February 2010, the CAP process, preliminary measures, and focus group feedback were presented to the Solano County Planning Commission in a public meeting. In March 2010, these same items were presented to the Solano County Board of Supervisors in a public meeting. In each case, decision-makers listened to public comments and provided direction and guidance regarding the inventory, projections, and preliminary reduction measures. This direction was considered in the development of the preliminary reduction measures which were presented to the Focus Group in May 2010 and subsequently incorporated within the draft CAP.

All meetings were open to the public and public comments were incorporated. Agendas, minutes and presentations are available on the County's website at:

http://www.co.solano.ca.us/depts/rm/planning/climate_action_plan/default.asp

In addition, the focus group representatives were provided with presentation materials workshop toolkits, and comment sheets to share with their constituents.

## Content

The CAP is organized into the following chapters:

### Chapter 1: Climate Change and Solano County

This chapter outlines the County's rationale and motivation for taking a leadership role in addressing climate change and developing and implementing the CAP. The chapter provides a brief overview of the science behind climate change, describes potential effects climate change may create in Solano County, and outlines state policy mandates to reduce GHG emissions. This chapter also outlines the development of CAP and provides a brief overview of its content and next steps.

### Chapter 2: Greenhouse Gas Emissions Inventory and Projections

This chapter describes the GHG emissions for the base year 2005, forecasts emissions in 2020 under a business as usual scenario, and describes the GHG reductions necessary to achieve the County's adopted target. This chapter also lists a series of programs and accomplishments that the County has achieved since development of the inventory.

### Chapter 3: Emission Reduction Measures and Actions

This chapter presents recommended GHG reduction measures within each of the five strategy sectors. Discussion of each recommended measure includes its reduction potential, costs, benefits, and implementation timeframes, including responsible departments and performance indicators the County and community can use to track progress.

### Chapter 4: Benchmarks and Next Steps

This chapter describes how the County will implement the measures and actions presented in the CAP, including a discussion of available funding. It also discusses the ongoing evaluation and evolution of the CAP. The CAP will include

provisions to track countywide progress and make necessary changes to facilitate achievement of the goal to reduce GHGs.

**Appendices**– The appendices provide more in-depth background information on emissions inventory methods (Appendix A), emissions reduction quantification methods (Appendix B), the economic assumptions used to estimate measure costs to the County (Appendix C), and a description of how this CAP meets BAAQMD qualification standards (Appendix D).

## Public Review

The County strongly encourages residents, business owners, farmers, ranchers and others within Solano County to review this Draft CAP and provide comments to the County. This Draft will be available for public review for a period of 30 days, prior to presentation and public hearings before the Solano County Planning Commission and Board of Supervisors. Members of the public are encouraged to attend these hearings and provide public comment.

The best way to learn about the planning process that led to creation of this Draft CAP and the upcoming public hearings is to visit the County's website at:

http://www.solanocounty.com/depts/rm/planning/climate_action_plan/agendas.asp

## Relationship to the California Environmental Quality Act

The County's approach to GHG reductions is similar to the climate change planning process being followed by more than 50 other California jurisdictions who are members of ICLEI – Local Governments for Sustainability. This process includes:

- Completing a baseline emissions inventory and projecting future emissions,
- Identifying a communitywide GHG reduction target,
- Preparing a plan to identify strategies and measures to meet the reduction target,
- Identifying targets and reduction strategies in the plan and evaluating its environmental impacts pursuant to CEQA,
- Monitoring effectiveness of reduction measures and adapting the plan to changing conditions, and
- Adopting the plan in a public process following environmental review.

This approach is also consistent with CEQA Guidelines Section 15183.5, 15064 and 15130 and the adopted BAAQMD CEQA Guidelines and Thresholds of Significance, which provide a means for jurisdictions to analyze and mitigate the significant effects of GHGs at a programmatic level by adopting a plan for the reduction of GHG emissions. Later, as individual projects are proposed that are consistent with the CAP, the project would be considered to have a less than significant impact (i.e. less than cumulatively considerable contribution) from GHG emissions and climate change. Please refer to Appendix D for a description of how this CAP meets BAAQMD qualification standards for a plan to reduce GHG emissions.

An Initial Study (IS) has been prepared to document the potential environmental effects of implementing the CAP. The IS relies upon analysis and conclusions provided in the 2008 Solano County General Plan Environmental Impact report.

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[i] SEDC Solano Economic Development Corporation, Solano County's Energy Cluster. Prepared by Collaborative Economics • November 2009, Page 10

[ii] IPCC 2007; Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the IPCC. Cambridge University Press. Cambridge, UK.

# GREENHOUSE GAS EMISSIONS INVENTORY, PROJECTIONS AND TARGET

Understanding existing greenhouse gas (GHG) emissions and estimating future emissions are important steps in the climate action planning process. The inventory and projections discussed in this chapter identify the sources, distribution, and overall magnitude of emissions generated within the unincorporated portions of Solano County. This information allows the County to develop specific measures and actions to reduce emissions over the next decade. A description of the methods and sources of information used to complete the 2005 GHG emissions inventory and 2020 projections is provided in Appendix A.

## GREENHOUSE GAS EMISSION INVENTORIES AND PROJECTIONS

### Baseline Inventory

In 2005, approximately 960,700 metric tons (MT) of carbon dioxide equivalent ($CO_2e$) emissions were generated within the unincorporated County. Table 2-1 presents a baseline inventory for the CAP and the percent contribution of each activity sector. Transportation-related activities contributed approximately 51% of the communitywide annual GHG emissions. Electricity and natural gas consumption contributed 22% of the emissions. GHG emissions associated with industrial processes generated more than half of these energy-related emissions. Commercial energy use generated approximately one third and residential energy use generated the remaining 12% of energy-related emissions. Agriculture, including livestock, field equipment, soil management, pesticides, and crop residue burning emissions made up approximately 21% of the inventory. The water sector contributed approximately 4% and the waste sector accounted for approximately 2%.

### Government-related Emissions

Government-related (municipal) GHG emission sources, which include government buildings, vehicle fleets, streetlights, and other government-owned/operated facilities, can be considered a subset of the communitywide emissions inventory. Government emissions were inventoried for 2005 for the energy, transportation, and water sectors based on available data. With a total of 17,159 MT CO2e, government-related emissions make up less than one percent of the overall 2005 emissions inventory. The Government-related emissions are summarized in Table 2-2.

### Projections

The community's GHG emissions were projected for the year 2020 under a business- as- usual, no-plan scenario. The scenario assumes that historical and current GHG-generating practices and trends for energy consumption, transportation, agriculture, solid waste, and water consumption will continue through 2020.

| Table 2-1: Solano County Baseline and Projected Emissions and Percent Contributions | | |
|---|---|---|
| **Emissions Sector** | **2005 Baseline MT $CO_2e$ (percent of total emissions)** | **2020 Projected MT $CO_2e$ (percent of total emissions)** |
| Transportation | 491,265 (51%) | 438,600 (48%) |
| *State Highways* | *384,238* | *340,470* |
| *County Highways* | *89,624* | *79,420* |
| *Boats* | *12,262* | *13,180* |
| *Locomotives* | *5,141* | *5,530* |
| Energy Consumption | 212,388 (22%) | 215,090(24%) |
| *Industrial Energy Use* | *112,176* | *108,790* |
| *Commercial Energy Use* | *75,217* | *78,720* |
| *Residential Energy Use* | *24,995* | *27,580* |
| Agriculture | 201,888 (21%) | 201,890 (22%) |
| *Livestock* | *91,901* | *91,900* |
| *Field Equipment* | *72,218* | *72,220* |
| *Soil Management* | *21,356* | *21,360* |
| *Pesticides* | *11,024* | *11,020* |
| *Crop Residue Burning* | *5,389* | *5,390* |
| Water Consumption | 34,964 (4%) | 37,810 (4%) |
| Solid Waste | 20,235 (2%) | 22,770 (3%) |
| **Total** | **960,740 (100%)** | **916,160 (100%)** |

Notes: $CO_2e$ = carbon dioxide equivalent; MT= metric tons;
Totals may not appear to add exactly due to rounding
Source: Data compiled by AECOM 2010.

Under these assumptions, the communitywide GHG emissions in unincorporated Solano County are anticipated to decrease from 960,700 MT $CO_2e$ in 2005 to about 916,200 MT $CO_2e$ in 2020. This represents a 4.7% decrease from the 2005 baseline. The distribution of emissions across sectors remains approximately the same in 2020 as in 2005. The projected decrease in 2020 emissions can be largely attributed to lower emission rates of GHGs from newer vehicles. In 2020, decreased emissions from individual vehicles would likely outweigh expected increases in Vehicle Miles Traveled (VMT).

**Table 2-2:**
**Solano County 2005 Government-Related Greenhouse Gas Emissions**

| Government Sector | 2005 Baseline MT $CO_2e$ (percent of total government-related emissions) |
|---|---|
| Buildings and Facilities | 6,668 (38,9%) |
| Vehicle Fleet | 4,001 (23,3%) |
| Street Lights and Traffic Signals | 37 (0.2%) |
| Electric Power (Co-generation) | 6,401 (37.3%) |
| Airport | 52 (0.3%) |
| **Total** | **17,159 (100%)** |

Notes: $CO_2e$ = carbon dioxide equivalent; MT= metric tons;

Totals may not appear to add exactly due to rounding

Source: Data compiled by AECOM 2009 from the Solano County Greenhouse Gas Emissions Inventory.

## GREENHOUSE GAS REDUCTION TARGETS

### Assembly Bill 32 and the Climate Change Scoping Plan

The State of California is a leader in global climate protection. Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006, requires California to reduce statewide GHG emissions to 1990 levels by 2020. AB 32 directs the California Air Resources Board (ARB) to develop and implement regulations that reduce statewide GHG emissions. ARB's *Climate Change Scoping Plan*, approved in December 2008, outlines the State's plan to achieve GHG reductions required in AB 32. The Scoping Plan contains the primary strategies California will implement to achieve a reduction of 169 million MT $CO_2e$, or approximately 28% from the State's projected 2020 emission level.

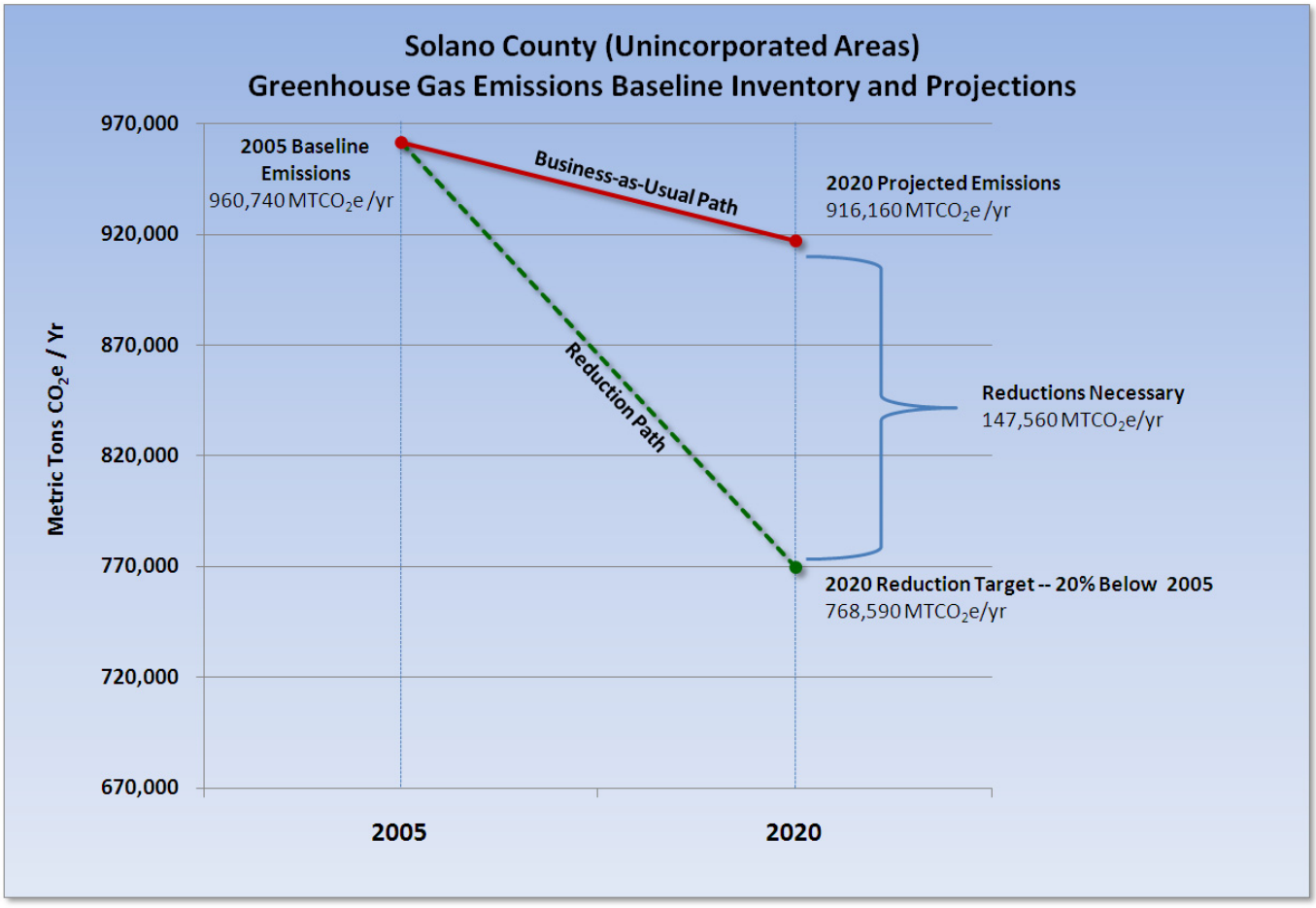


**Figure 2-1: Greenhouse Gas Emissions Baseline Inventory and Projections**

Though the Scoping Plan does not define the specific role local governments will play in meeting the State's GHG reduction goals, it identifies cities and counties as "essential partners" within the overall statewide effort, and recommends that local governments reduce emissions by 15% below current levels by 2020.

### Bay Area Air Quality Management District California Environmental Quality Act Guidelines

In June 2010, the Bay Area Air Quality Management District (BAAQMD) adopted revised California Environmental Quality Act (CEQA) Guidelines. The Guidelines establish thresholds of significance for operational GHG impacts of long-range plans (e.g., general plans, climate action plans). BAAQMD encourages jurisdictions to adopt a binding GHG reduction target that meets or exceeds one of the following options, all based on AB 32 goals:

- Reduce emissions to 1990 level by 2020,
- Reduce emissions 15% below baseline (2008 or earlier) emission level by 2020, or
- Meet the plan efficiency threshold of 6.6 MT $CO_2e$ per service population per year (where service population equals population + employees).

The Guidelines state that if a plan establishes goals, policies, performance standards, and implementation measures capable of achieving one of these levels of GHG emission reduction, subsequent projects consistent with the plan could be relieved of performing GHG analysis as part of their CEQA compliance.

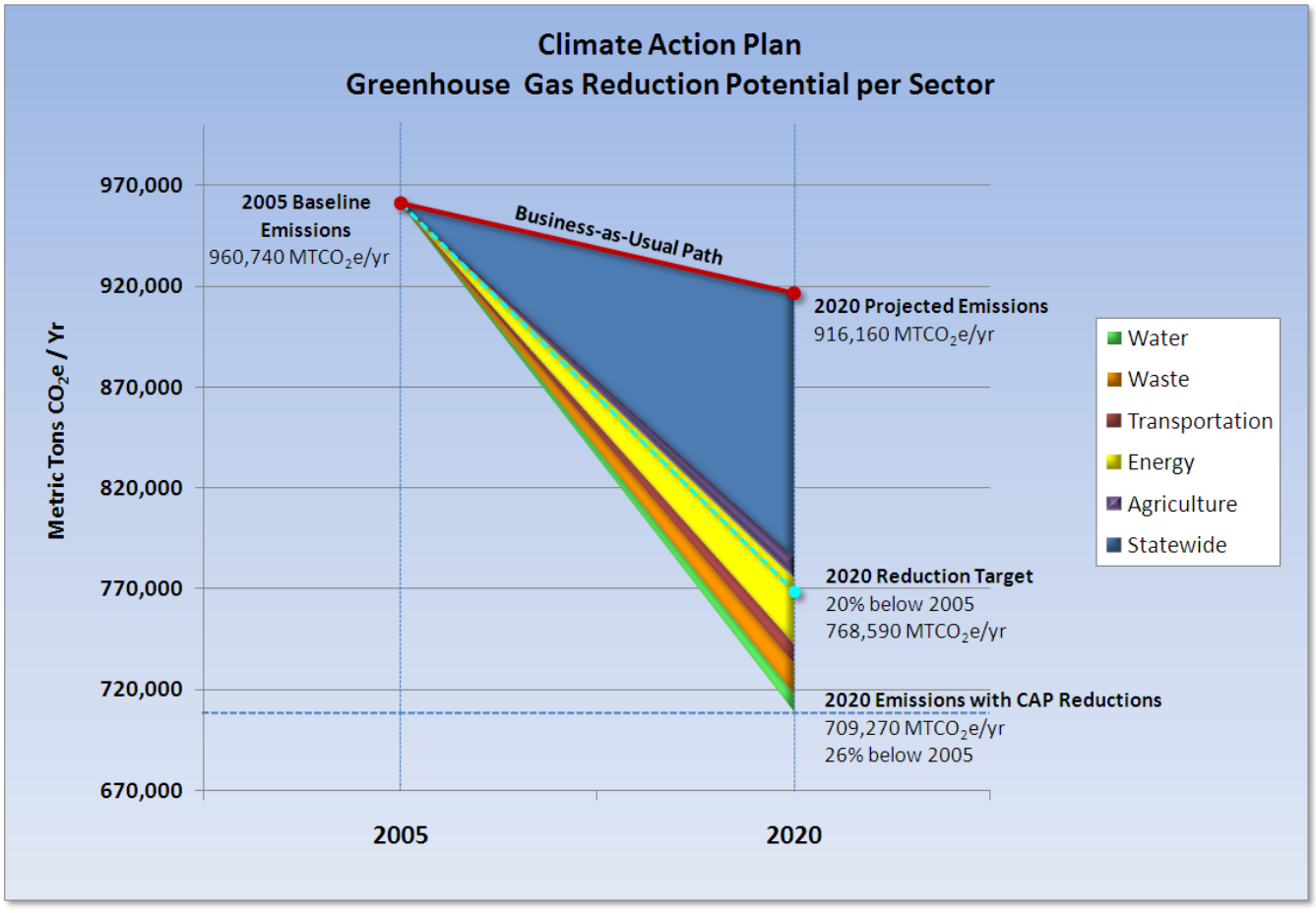


**Figure 2-2: Greenhouse Gas Reduction Potential per Sector**

### Solano County Greenhouse Gas Reduction Target

In compliance with the Scoping Plan and the BAAQMD CEQA Guidelines, **Solano County will reduce communitywide GHG emissions by 20% below 2005 baseline emission levels by 2020**. By implementing measures and actions outlined within this CAP, combined with statewide reductions, it is possible for the County to achieve and surpass this target, resulting in a GHG emissions reduction of 26% to approximately 709,270 MT $CO_2e$ in 2020. This would be a reduction of 206,880 MT $CO_2e$ below 2020 business-as-usual projections.

## Accomplishments of Recent Programs and Policies

Solano County has taken active steps since 2005 to continue its commitment to protecting and preserving its natural resources and to providing a healthy living environment. The County has adopted numerous policies, programs, and incentives to assist the community in preserving its environment. Most of these efforts have other community co-benefits beyond reducing GHG emissions. A brief overview of County programs within each sector is provided below.

### Energy

Solano County has been demonstrating leadership in green energy since it constructed its first major electrical generation project in 1989, when it built a 1,500 kilowatt combined heat and power (cogeneration) plant to serve the new County jail facility. Since then, Solano County has expanded the cogeneration plant to 2,900 kilowatt capacity and implemented numerous energy conservation, generation and renewable energy programs[i].

The latest project, a 746 kilowatt solar array on a parking shelter, earned Solano County the distinction as the largest producer of solar energy in the county. Solano County produces and contracts 57% of the electricity it consumes from alternative energy sources (including 49% from combined heat and power and 8% from solar). Projects are being considered that will increase that percentage to over 70% by 2011. As a whole, Solano County has invested more than $30 million in energy projects and has recognized tens of millions of dollars worth of energy cost savings. The County's efforts have garnered several awards, including the 2003 Environmental Protection Agency's Green Power Partnership Award.

As a result of a series of Economic Summits that the County held in 2007, a study of the energy industry cluster in Solano County was conducted. The report determines the existing scope and potential growth of the energy industry, especially renewable energy. The findings were presented by the Solano Economic Development Corporation in November 2009[ii].

Expanded green energy production in Solano County is also addressed in the County General Plan, which was cited by the California Attorney General's Office as a leader in addressing the state's mandated Climate Warming/Greenhouse Gas Emission requirements. General Plan implementation efforts include development and adoption of this CAP.

### Transportation

#### Commuter Incentives

The Solano Transportation Authority (STA) has established several commuter and rideshare incentives in the past few years to reduce the use of single-occupant vehicles by increasing participation in public transit, ridesharing, bicycling, and walking.

These programs include the Solano Napa Commuter Information (SNCI) Program ; Emergency Ride Home (ERH) Program; Lifeline Transportation Program (LTP); Transportation for Livable Communities (TLC) Program; Safe Routes to School (SR2S) Program; Solano Bicycle and Pedestrian Program (SBPP); Transportation For Clean Air (TFCA) Program; and Solano Congestion Management Program (CMP)[iii].

#### Safe Routes to Schools Program

On February 13, 2008, the STA Board adopted a Safe Routes to School Plan and authorized staff to create a Safe Routes to School Program in Solano County.[iv] The program's goal is to improve student travel safety and increase the popularity of students walking and bicycling to school. The STA accomplishes this goal by working with a variety of stakeholders across the county to plan and carry out education programs.

#### County Fleet Fuel Efficiencies

The County's 504-vehicle light equipment fleet includes four low-speed neighborhood all-electric vehicles, 15 hybrid vehicles and 91 flex-fuel vehicles capable of running on the alternative fuel E85, which is comprised of 85% alcohol and 15% unleaded gasoline. Installation of an above-ground tank for E85 is in progress at the County corporation yard in Fairfield. Bio-diesel is used in most of the County's heavy equipment fleet, which includes construction equipment such as road graders, backhoes, and wheel loaders, and to fuel diesel-powered light pickup trucks and medium-duty trucks. Additionally, propane is used to fuel some medium-duty trucks used for road construction.

### Green Building Program

To assist Solano County with promoting the health, safety, welfare and sustainability of the community, the County established a voluntary Green Building Program in June 2008, which provides incentives for property owners and building professionals wishing to build green to voluntarily participate. Resources and information about green building standards are available on the County's website.[v]

A Mandatory Green Building Program was recently published by the State of California. The 2010 California Green Building Standards will be mandated for each jurisdiction in the State beginning January 1, 2011. This is the first mandatory green building code in the nation, and it will require applicable projects to meet the minimum requirements of most certified green building programs (e.g., LEED, Build It Green, National Green Building Standards).

### Bay Area Green Business Program

The County has been participating in the Bay Area Green Business Program since July 2007. This program uses a team-based approach among local and regional agencies to help businesses comply with environmental regulations, conserve resources, prevent pollution, and minimize waste in their operations. To date, eight Solano County businesses have been green certified, and 19 are working toward certification.

### Recycling & Waste Management

#### Recycling Guide

Other aspects of greening Solano County's future are the efforts to reduce, reuse or recycle. Solano County's Integrated Waste Management Division has developed a Recycling Guide, a resource document printed and distributed annually to the community as part of the AT&T Yellow Pages. Its website equivalent, www.recycle-guide.com, includes time-sensitive event and program information.

### Reduce, Reuse, Recycle

County employees incorporate reduce, reuse or recycle concepts within their daily activities. For example, the Public Works Traffic Division strips, cleans and reuses old aluminum road signs, Public Works Operations uses erosion control devices made from recycled tires, and General Services Facilities Operations uses recycled landscape materials and recycles green waste. The Public Works Operations staff also cleans up litter and illegal dumping sites along County roads, which in turn is either recycled or properly disposed. These efforts were augmented in September 2008 when the Board of Supervisors approved the creation of an Illegal Dumping program that has enabled the Sherriff's Office to assist in the investigation of items illegally dumped along roads in unincorporated areas.

*The Anheuser-Busch Fairfield brewery brews, packages, and ships approximately 4 million barrels of beer annually. Recycling, water conservation, and energy conservation are a way of life at the Fairfield brewery. In 2008, the brewery recycled 99.1% of its solid waste. This equaled 79,915 tons of materials reclaimed or recycled in 2008. This resulted in more than $5 million in reduced landfill disposal costs and increased recycling revenue.*

Solano County's Waste Tire Enforcement Program ensures businesses that generate or haul waste tires properly dispose or recycle this material. A Waste Tire Amnesty Day in September 2008 collected more than 15,000 tires for recycling. The facilities who have partnered with the County are Recology Vallejo, Recology Hay Road, and Potrero Hills Landfill. In 2009, 4,854 passenger tires and 437 tractor tires were registered, with a total participant level of 322 residents[vi].

### Pharmaceutical Drop-off Program

In 2009, 671 pounds of pharmaceutical materials were collected from 240 Solano County residents who participated in a week-long Pharmaceutical Drop-off event. Disposing of pharmaceuticals properly (i.e., by not flushing them) protects water resources and reduces water treatment costs and GHG emissions.

### Biosolids to Energy Project

Environmental protection measures are also ensuring responsible environmental stewardship in Solano County. For example, the County oversees a comprehensive policy for land application of biosolids. This local ordinance requires that biosolids generators identify other methods to use the material and encourages conversion of biosolids to energy to meet this requirement. The Bay Area Clean Water Agencies Steering Committee (BACWA) is an active participant in the department's biosolids stakeholder group meetings and is currently pursuing a biosolids to energy project (B2E) as one method to comply with local requirements. An application for a Regional Biosolids Facility is currently undergoing environmental review[vii].

### Waste Reduction Awards Program

The 2009 Waste Reduction Awards Program (WRAP), now in its 16th year, is sponsored by the California Integrated Waste Management Board. More than 250 California businesses and nonprofit organizations are being recognized for their innovative, environmentally friendly programs and policies by being named recipients of the program. In 2009, Solano County was represented by six companies: Anheuser-Busch, Inc., Fairfield; Genentech, Inc. Vacaville Operations, Vacaville;

Jane Bogner, Paul Roberts & Partners, Inc., VALCORE Recycling, and Vallejo Garbage Service.

### Consumer Protection & Education

The Solano County District Attorney has one of the most active Consumer and Environmental Crimes Units in California, demonstrating the department's commitment to both protecting and improving the environment through appropriate enforcement measures as well as by promoting self-help, education and responsible environmental practices.

The District Attorney also hosts educational presentations and seminars at various public venues, such as senior citizen centers, and at public service organization meetings. Along with information about how to be a more environmentally responsible citizen, the District Attorney encourages the public to scrutinize environmental claims in both the news and advertising media to foster better common understanding of the meaning of terms such as "recycling," "biodegradable," and "environmentally friendly."

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[i] http://www.co.solano.ca.us/news/displaynews.asp?NewsID=146&TargetID=7, accessed July 2010

[ii] SEDC Solano Economic Development Corporation, Solano County's Energy Cluster. Prepared by Collaborative Economics • November 2009

[iii] http://www.sta.dst.ca.us/commuterinfo.html.

[iv] http://www.sta.dst.ca.us/programs.html#sr2s

[v] http://www.co.solano.ca.us/civica/filebank/blobdload.asp?BlobID=5415

[vi] http://www.co.solano.ca.us/civica/filebank/blobdload.asp?BlobID=8190

[vii] http://www.co.solano.ca.us/civica/filebank/blobdload.asp?BlobID=5415 , 2009 Annual Biosolids Land Application Report, Feb 23, 2010.

# GREENHOUSE GAS EMISSION REDUCTION MEASURES AND ACTIONS

This chapter describes measures and actions necessary to reduce greenhouse gas (GHG) emissions in the county and achieve the reduction target. Each measure is enforceable, includes a timeline, and assigns responsibility to relevant agencies and departments. In addition to GHG reduction measures, the chapter provides actions to ease implementation and incorporate public education efforts. The effectiveness of measures and actions will be evaluated annually and modified as necessary to achieve the County's reduction goals.

## Reduction Sectors

Building on the County's tradition of environmental leadership, the Climate Action Plan (CAP) sets forth a strategy to reduce communitywide GHG emissions. Even though the majority of reductions are due to statewide regulations, implementing reduction strategies in the five main sectors presented in this chapter can assist the County in achieving its reduction target of 20% below 2005 emission levels. The strategies identified in this chapter affect issues within the County's direct influence. Each strategy-sector is subdivided into a series of reduction measures.

Measures were developed by (a) evaluating existing community conditions, (b) identifying emission reduction opportunities within the county, including those identified by the Climate Action Plan Focus Group, (c) reviewing best practices from other jurisdictions and organizations, and (d) incorporating State and regional laws, guidelines, and recommendations. After considering a wide range of potential options, measures and actions were recommended based on the following criteria:

- What is the cost of implementation to the County?
- Is it technically possible to implement the measure and would the community support it?
- Does the measure create additional community benefits (e.g., quality of life, public health)?

The five strategy-sectors are organized as follows:

**Agriculture**
Agriculture plays an important role in Solano County and provides unique opportunities to reduce GHG emissions while improving sustainable farming and production methods, capturing carbon emissions, and strengthening the distribution network in local communities.

**Transportation and Land Use**
The transportation and land use strategy identifies ways to improve mobility opportunities such as walking, biking, and transit use, and to decrease the need to drive. As development options are limited in Solano County, land use measures focus on protecting existing areas that function as carbon sinks and provide carbon sequestration.

**Energy Use and Efficiency**
The energy use and efficiency strategy recommends ways to increase energy efficiency in existing buildings, enhance energy performance for new construction, and increase use of renewable energy.

**Water Use and Efficiency**
The intent of the water use and efficiency strategy is to reduce water use and related GHG

emissions through increasing efficiencies, conservation and reuse.

**Waste Reduction and Recycling**
The waste reduction and recycling strategy builds on past County successes by increasing waste diversion, which focuses on reducing consumption of materials that otherwise end up in landfills, and finding ways to recycle especially organic waste into new resources.

Measures and actions are recommended in each sector that translate the CAP's vision into on-the-ground action. *Measures* define the direction that the County will take to accomplish GHG reduction goals. *Actions* define the specific steps that the County will take over time.

## Reduction Potential

In 2020, GHG emission reductions from the five strategy sectors within the CAP have the potential to reduce GHGs by 76,440 metric tons of carbon dioxide equivalent (MT $CO_2e$) emissions. GHG emission reductions attributed to State legislation have the potential to reduce GHG emissions by another 130,440 MT $CO_2e$. Together, statewide legislation and GHG reduction strategies have the potential to reduce GHG emissions in unincorporated Solano County by approximately 206,880 MT $CO_2e$, which is approximately 26.2% below 2005 emission levels as measured from business-as-usual conditions in 2020. Thus, the CAP identifies a path to exceed the County's GHG reduction target of 20% below 2005 emission levels by 2020.

Table 3-1 summarizes the GHG reduction potential of the CAP and State legislation. Figure 2-2 in Chapter 2 indicates the GHG reduction potential of each of the emission reduction strategies and emission reductions associated with State legislation.

**Table 3-1: Total GHG Emission Reductions**

| GHG Emission Reduction Area | 2020 GHG Emission Reductions (MT $CO_2e$) | % |
|---|---|---|
| Recommended CAP Measures | 76,440 | 37% |
| State Legislation | 130,440 | 63% |
| **Total GHG Emission Reductions** | **206,880** | **100%** |

## Chapter Structure

This section of the CAP is organized by strategy-sector (e.g. agriculture; transportation and land use; energy use and efficiency; water conservation, and waste reduction and recycling). These five strategy-sectors represent the primary ways to reduce communitywide GHG emissions in Solano County. Each section begins with an introduction to the strategy-sector, including potential GHG emissions and reductions. This introduction is followed by the measures and actions that translate the County's general plan policies to on-the-ground implementation.

### Reduction Measures

Measures define the programs, policies, and projects that the County will undertake to accomplish its GHG emission reduction target. The following paragraphs describe the format and content of the measures.

### Measure Description

Measure descriptions provide important background information describing the County's rationale and policy direction. Additionally, some descriptions provide detailed guidance that will be used in program implementation.

### Action and Progress Indicator Tables

Detailed action steps and progress indicators are provided in a table following each measure description. Actions identify specific steps that the County will take to implement each measure. These tables also identify responsible departments and establish an implementation schedule for each action. Progress indicators and performance targets provided in the table enable staff, the Board of Supervisors, and the public to track implementation and monitor overall CAP progress. Finally, each table identifies General Plan goals and policies that are related to the measure.

### Greenhouse Gas Reduction Potential

Values within the GHG Reduction Potential column of the measure summary identify the estimated annual emission reductions anticipated in 2020 in MT $CO_2e$. Many measures generate directly attributable GHG reductions. However, not all measures have a quantifiable GHG reduction potential. Non-quantified measures are included in the CAP as supporting measures that facilitate the reduction potential of related quantified measures, or that complement the overall suite of measures and actions proposed throughout the CAP.

Non-quantified measures consist of measures for which a GHG reduction potential could not be estimated at the time of plan preparation for one of the following reasons: (a) insufficient data exists to quantify GHG reduction potential, (b) no reliable quantification methodology currently exists to calculate these reductions, or (c) the GHG emission reductions attributable to the measure do not directly reference any component of the baseline GHG inventory, and thus cannot be counted towards the County's 2020 emissions reduction target. Supporting measures remain within the CAP because the County and the community recognize that even though their effect cannot be measured, these actions do reduce global emissions and have important community benefits. Additional information pertaining to the GHG reduction calculations is provided in Appendix B.

### Community Benefits

Beyond reducing emissions, many recommended CAP measures have the potential to provide other important benefits to the community. These benefits represent an improvement in the quality of life in Solano County and protect the earth's climate. They are identified using the following icons:

Reduces heat island effect

Improves public health

Creates jobs

Reduces waste

Strengthens agriculture

Provides long-term savings to residents

## Costs

For each measure, potential costs to the County, are categorized as very low, low, medium, and high. Table 3-2 summarizes these category definitions. Supporting information on costs is provided in Appendix C.

The County also sought to balance public versus private costs to gain maximum benefits at the lowest cost for the County and its residents. For example, incentive-based measures often carry a higher cost for the County and a lower cost for the private sector. However, incentives are often not as effective in achieving full participation; whereas regulatory measures such as ordinances can be inexpensive to the County, yet may cause a higher cost to the private sector.

This section presents a full range of reduction strategies that, together, have potential to reduce countywide GHG emissions by more than 20% by 2020. However, the County recognizes that funding sources are currently limited, and has identified alternative implementation pathways with lower costs and/or delayed implementation that would also enable target achievement. These alternative implementation pathways are further described in Chapter 4.

Table 3-2: Measure Cost Ranges

| Cost Type | Range |
|---|---|
| Cost to County (initial investment costs + ongoing operating costs, where applicable, represented as average annual costs) | Very Low: < $10,000<br>Low : $10,001 - $50,000<br>Medium: $50,001 - $250,000<br>High: $250,001 or greater |

## Funding and Financing

Though the County will bear some financial burden to implement measures in the CAP, a wide range of funding sources and financing strategies can be leveraged to offset costs to the County and local residents and businesses.

Chapter 4 and Appendix C provide a discussion of applicable funding sources and financing programs. Most, if not all, of the sources described require additional effort to access. Although information in the CAP is current as of 2010, the array of funding and financing options is ever-evolving. Additional opportunities for funding or financing CAP measures will likely emerge as the County implements the CAP.

# Statewide Reductions

To implement Assembly Bill (AB) 32, the State of California has established companion legislation that will reduce statewide generation of GHG emissions across all emissions sectors. AB 1493 establishes performance standards for GHG emission reductions from motor vehicles. Executive Order (EO)-S-1-07 establishes performance standards for the carbon intensity of transportation fuels. Senate Bill (SB) 107 establishes performance standards for GHG emission reductions from electric utilities.

At the time of CAP preparation, the County only has confidence in estimating the GHG emission reductions associated with AB 1493 and EO-S-1-07. In the future, as the regulatory framework surrounding AB 32 grows, it may be possible to evaluate a wider range of statewide reductions.

## Assembly Bill 1493 (Pavley)

AB 1493, California's mobile-source GHG emissions regulations for passenger vehicles, was signed into law in 2002. It is expected that implementation of AB 1493 would reduce on-road mobile-source GHG emissions by approximately 98,280 MT CO2e by 2020.

## Executive Order S-1-07 (The Low Carbon Fuel Standard)

Executive Order S-01-07 reduces the carbon intensity of California's transportation fuels by at least ten percent by 2020. The Low Carbon Fuel Standard (LCFS) is a performance standard with flexible compliance mechanisms that incentivizes the development of a diverse set of clean, low-carbon transportation fuel options to reduce greenhouse gas emissions. It is expected that implementation of the standard would reduce on-road mobile-source GHG emissions by approximately 32,160 MT $CO_2e$ by 2020.

## Renewable Portfolio Standard

SB 1078, SB 107, and Executive Order-S-14-08 have established increasingly stringent Renewable Portfolio Standard (RPS) requirements for California utilities. RPS-eligible energy sources include wind, solar, geothermal, biomass, and small-scale hydro. SB 1078 required investor-owned utilities to provide at least 20% of their electricity from renewable resources by 2020. SB 107 accelerated the timeframe to take effect in 2010. EO-S-14-08 increased the RPS further to 33% by 2020.

SB 1078, SB 107, and EO-S-14-08 are not quantified in this CAP because only the electricity consumed by county residents and business that choose to opt out of the proposed Community Choice Aggregation (CCA) program (see Measure E-1) would be affected. Within the CCA measure, it is assumed that 25% of the county would opt out of the CCA program. This number could be lower and therefore no emission reductions have been credited to Solano County for SB 1078, SB 107, and Executive Order S-14-08. If the CCA program is not implemented then, the County should quantify and credit reductions from legislation.

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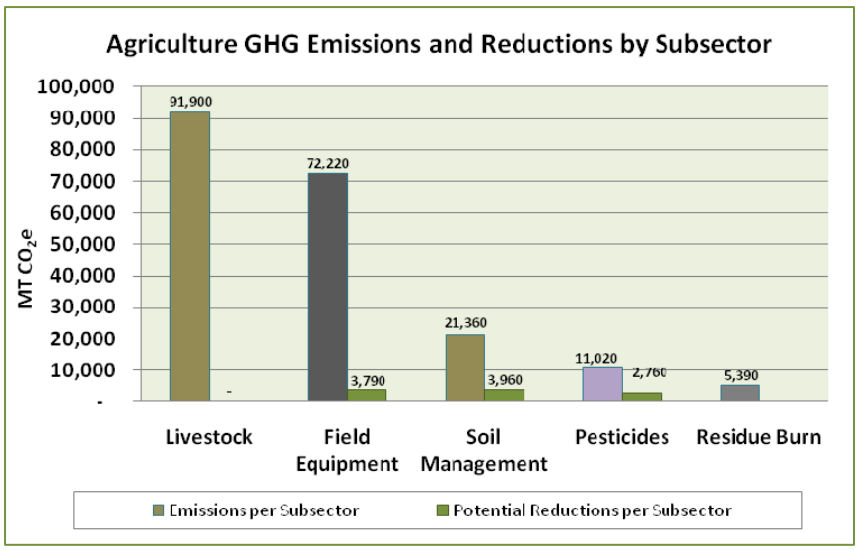
# Agriculture

## OBJECTIVE: PROMOTE SUSTAINABLE AND ECONOMICALLY VIABLE AGRICULTURAL PRACTICES.

Agriculture is central to Solano County's economy, lifestyle, and landscape. Like other economic activities, agriculture generates GHGs and contributes more than 16% of the County's total current emissions. The 2005 baseline inventory separates agricultural emissions into five distinct subsectors: livestock, field equipment, soil management, pesticides, and crop residue burning.




Crop types and farming practices vary with market and agronomic conditions. This variability makes estimating future levels of agricultural emissions challenging. The CAP makes the assumption that baseline (2005) emission levels will continue in the future.

Methane and nitrous oxide generated by livestock and livestock manure produces the largest amount of emissions, followed by carbon dioxide emissions generated from fossil fuel combustion in field equipment. Together, these two subsectors generate more than 80% of all agricultural emissions. Soil management, pesticides, and crop residue burning make up the remainder. Soil management emissions consist of nitrous oxide that results primarily from use of manufactured and organic natural fertilizers. Within Solano County, the primary source of pesticide-related GHG emissions is the fumigant sulfuryl fluoride, a gas with a very high global warming potential. Crop residue burning releases carbon dioxide into the atmosphere.

The County has identified opportunities to reduce 5% of agricultural emissions in three of the five subsectors. Reducing the use of the pesticide sulfuryl fluoride and soil management practices that decrease nitrous oxide emissions, including conservation tillage, winter cover cropping, and reducing mineral fertilizer application rates, will allow the highest level of reductions. Conservation tillage, cover cropping, and other practices such as establishing hedgerows and permanent crops will also allow additional atmospheric carbon to be sequestered. Fuel efficiency improvements in field equipment will provide the third highest reduction. Installing biogas control systems could address a small portion of the livestock emissions.

Encouraging best practices on Solano farms and ranches is an important part of the County's climate protection efforts. The measures and actions described on the following pages strive to reduce GHG emissions and increase the long-term viability of the agricultural economy.

**GHG Reduction Potential**

**10,510 MT $CO_2$/yr**

## Soil Management and Carbon Sequestration

**AG-1: Develop a program that provides outreach, technical assistance, and incentives to promote soil management techniques that reduce nitrous oxide emissions and increase carbon sequestration within agricultural operations.**

*Measure Description:*

The use of mineral and organic nitrogen fertilizers in agriculture results in the emission of nitrous oxide, a potent GHG. Farming practices such as conservation tillage, winter cover cropping, and reduced nitrogen fertilizer application can effectively reduce these emissions. These and other practices also have the potential to capture atmospheric carbon within the soil.

The County, in partnership with UC Agricultural Extensions and other organizations, will facilitate farmer-to-farmer demonstrations, fund applied research, and provide technical assistance that encourages farmers to adopt practices that reduce nitrous oxide emissions and sequester carbon. Market-based incentives would increase the effectiveness of these practices. The County will work with other jurisdictions and organizations to encourage development of a verification protocol for agricultural nitrous oxide emissions reductions. Such a protocol would allow farmers to participate in existing carbon markets and receive payments for nitrous oxide reductions and carbon sequestration achieved on their farms.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Develop a targeted outreach campaign and technical assistance program to encourage conservation tillage, winter cover cropping, reduced fertilizer application and other relevant practices. | Medium Term (3-5 years) | Agriculture Department |
| **B** | Develop a coalition to encourage the development of a verification protocol that provides guidance to calculate, report, and verify nitrous oxide emission reductions in agricultural practices. | Medium Term (3-5 years) | Agriculture Department |
| **Performance Indicator** | | Target | |
| **i** | Acres of corn, alfalfa, and wheat with 25% reduction in mineral fertilizer application from baseline (2005). | 66,277 by 2020 | |
| **ii** | Acres of crops (other than corn, alfalfa, and wheat) with 10% reduction in mineral fertilizer application from baseline (2005). | 51,058 by 2020 | |
| **Related General Plan Policies and Implementation Programs** | | | |
| **AG.P-19** Require agricultural practices to be conducted in a manner that minimizes harmful effects on soils, air and water quality, and marsh and wildlife habitat.<br>**AG.P-21** Promote natural carbon sequestration to offset carbon emissions by supporting sustainable farming methods (such as no-till farming, crop rotation, cover cropping, and residue farming), encouraging the use of appropriate vegetation within urban-agricultural buffer areas, and protecting grasslands from conversion to non-agricultural uses. | | | |

**GHG Reduction Potential (MT $CO_2e$/yr):**

***3,960***

**Community Benefits:**

**Cost to County**

*Medium*

*Photo by Anil Shresta, UC Davis Photo Description: Stands of transplanted tomatoes in no till, sub-surface drip irrigated beds with no herbicides.*

## Field Equipment Outreach Program

**AG-2: Develop an outreach program aimed at reducing field equipment emissions and fuel costs.**

*Measure Description:*

Field equipment generates a considerable portion of Solano County's Agriculture sector emissions. Additionally, the US Department of Energy projects that fuel costs (diesel, gasoline, and natural gas) will rise sharply within the next decade, increasing the cost of farming. These two factors provide motivation to improve field equipment fuel efficiency.

The County will host workshops and prepare outreach materials focused on reducing energy consumption in farm operations. Workshops will address equipment maintenance and operation (i.e., optimizing drawbar load, using effective travel patterns, reducing tire slippage, optimizing irrigation pumps). The workshops will be offered in English and Spanish. The County will also work with State agencies, farming associations, and equipment retailers to provide farmers and ranchers with information about the fuel efficiency of field equipment.

Overall, the County aims to facilitate a 15% increase in field equipment energy efficiency in 35% of farm operations. In order to track these improvements the County will need to establish baseline levels of equipment efficiency and monitor improvement over time.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Fund workshops/presentations and outreach materials focused on reducing fuel consumption and increasing renewable energy generation in agricultural operations. | Medium Term (3-5 years) | Agriculture Department |
| **B** | Work with State agencies and farming associations to develop a list of fuel-efficient farming equipment and disseminate throughout the agricultural community. | Medium Term (3-5 years) | Agriculture Department |
| **C** | Conduct surveys to establish baseline field equipment energy efficiency and monitor progress over the next decade. | Medium Term (3-5 years) | Agriculture Department |
| **Performance Indicator** | | Target | |
| **i** | Efficiency improvement in field equipment energy use (assumes 35% participation) | 15% by 2020 | |
| **Related General Plan Policies and Implementation Programs** | | | |
| **AG.I-22:** Promote sustainable agricultural activities and practices that minimize impacts on soil quality and erosion potential, water quantity and quality, energy use, air quality, and natural habitats. Sustainable agricultural practices should be addressed in the County's proposed Climate Action Plan to address climate change effects. | | | |

**GHG Reduction Potential (MT $CO_2e$/yr):**

***3,790***

**Community Benefits:**

**Cost to County**

*Medium*

## METHANE EMISSION CONTROL AND BIOGAS POWER GENERATION

**AG-3: Encourage confined livestock operations within the County to develop biogas control systems and biogas power-generation systems.**

*Measure Description:*

Solano County has three confined livestock operations. Installing biogas control systems (BCS) in confined livestock facilities presents an excellent opportunity to capture methane emissions, improve air quality, and generate renewable energy. The Climate Action Registry's Livestock Project Protocol provides a means to quantify and report GHG emission reductions achieved by installing BCS. These reductions can be traded within existing carbon markets. Opportunities exist for dairy operators to partner with carbon market financiers to install BCS for little to no cost.

In addition to their ability to capture and destroy methane gas from manure treatment and storage facilities, BCS generate renewable energy. Whether used on-site or sold to the grid, this can reduce a farm's operational costs.

All confined livestock operations will be encouraged to couple BCS with power-generation systems to generate renewable energy.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Reach out and provide information to confined livestock operations in the County about biogas mitigation opportunities and potential for private carbon market-based funding. | Short Term (1-2 years) | Agriculture Department |
| **Related General Plan Policies and Implementation Programs** | | | |
| **PF.I-5:** Work with the owners and operators of methane-producing facilities (e.g., landfills, dairies, wastewater treatment plants) to establish methane recovery and electricity generation systems. | | | |
| **PF.P-28:** Promote technologies that allow the use and reuse of solid waste, including biomass or biofuel as an alternative energy source. | | | |

**GHG Reduction Potential (MT $CO_2e$/yr):**

*Supporting measure*

**Community Benefits:**

**Cost to County**

*Low*

*Photo by Brad Zweerink, The Reporter*
*Photo Description: Cows at the Heritage Dairy southeast of Dixon*

## FUMIGANT ALTERNATIVES

**AG-4: Encourage the use of alternatives to the fumigant and potent greenhouse gas Methyl Bromide and other fumigants with high global warming potential.**

*Measure Description:*

Methyl bromide is an odorless, colorless gas that has been used as a soil fumigant and structural fumigant to control pests in the agricultural sector. Because it depletes the stratospheric ozone layer, the amount of methyl bromide produced and imported in the U.S. was reduced incrementally until it was phased out in January 1, 2005, pursuant to obligations under the Montreal Protocol on Substances that Deplete the Ozone Layer and the Clean Air Act. Allowable exemptions to the phaseout include 1) the quarantine and preshipment exemption, to eliminate quarantine pests, and 2) the critical use exemption, designed for agricultural users with no technically or economically feasible alternatives. Sulfuryl fluoride was developed as an alternative to methyl bromide. While sulfuryl fluoride does not affect the ozone layer, it has an extremely high global warming potential – 4,800 times more potent than carbon dioxide. In 2005, over 6,000 pounds of the fumigant were used within the county, resulting in 11,000 MT $CO_2e$ of GHG emissions. Due to State of California pre-emption laws, Solano County cannot ban the use of sulfuryl fluoride, however the County aims to reduce methyl bromide application entirely by 2020. Achieving these reductions will rely on facilitating the use of viable alternatives.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Work with UC Agricultural Extensions to inform food processors, storage operators, and pest control professionals about effective alternatives to sulfuryl fluoride. | Short Term (1-2 years) | Agriculture Department |
| **B** | Encourage the State to find viable alternatives to the use of sulfuryl fluoride and other pesticides with high global warming potential by 2020. | Short Term (1-2 years) | Agriculture Department |
| **C** | Develop workshops that provide technical education about Integrated Pest Management practices. | Short Term (1-2 years) | Agriculture Department |
| **Performance Indicator** | | Target | |
| **i** | Pounds of fumigants used in the county | 8,240 by 2020 | |
| **ii** | Pounds of methyl bromide used in the county | 0 by 2020 | |
| **Related General Plan Policies and Implementation Programs** | | | |
| **AG.I-22:** Promote sustainable agricultural activities and practices that support and enhance the natural environment. These activities should minimize impacts on soil quality and erosion potential, water quantity and quality, energy use, air quality, and natural habitats. Sustainable agricultural practices should be addressed in the County's proposed Climate Action Plan to address climate change effects. | | | |

**GHG Reduction Potential (MT $CO_2e$/yr):**

***2,760***

**Community Benefits:**

**Cost to County**

*Low*

## LOCAL MARKETS

**AG-5: Assist agricultural producers and processors in efforts to increase the sale of locally grown-products to local/regional markets.**

*Measure Description:*

Food that is highly processed, transported long distances, or grown out-of-season generates higher levels of GHG emissions than minimally processed, local, and seasonal foods. By purchasing locally grown products, residents and businesses can reduce GHG emissions and contribute to the viability of the County's farms and ranches.

The County will assist local agricultural organizations to develop a "Grown in Solano County" marketing campaign and encourage schools, hospitals, prisons and other institutions to purchase local products. The County will adopt a procurement policy that requires all County events to purchase locally grown food when feasible.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Work with local agricultural organizations to develop a "Grown in Solano County" label and marketing campaign. | Short Term (1-2 years) | Agriculture Department |
| **B** | Create an outreach program to encourage school districts, health care centers, prisons and other institutions to purchase food products from Solano County growers and ranchers. | Medium Term (3-5 years) | Agriculture Department |
| **C** | Promote the USDA "Farm to School Initiative" and "Know Your Farmer, Know your Food" Programs. Facilitate access to federal grants and marketing support for these programs. | Short Term (1-2 years) | Agriculture Department |
| **D** | Adopt a resolution to procure locally produced food for all County events and encourage vendors at County sponsored events to procure food within the county. | Short Term (1-2 years) | Agriculture Department |
| **Performance Indicator** | | Target | |
| **i** | Percentage of County events serving locally grown food products. | 100% by 2012 | |
| **Related General Plan Policies and Implementation Programs** | | | |
| **AG.P-20:** Protect, encourage, and provide incentives to agricultural processors that serve local/regional markets. | | | |
| **AG.P-13:** Support changes in local, state and federal taxing structures that promote the retention of production agriculture and the beneficial use of agricultural byproducts. | | | |

**GHG Reduction Potential**

*Supporting measure (not in inventory)*

**Community Benefits:**

**Cost to County**

*Low*

## AGRICULTURAL OMBUDSMAN

**AG-6: Allocate financial resources towards the position of a County Agricultural Ombudsman.**

*Measure Description:*

The 2008 General Plan describes the development of an agricultural ombudsman position to address some of the issues facing agriculture within the County. In addition to the role of developing strategic marketing plans and serving as an intermediary between County officials and local agricultural businesses, the ombudsman will play a key role in facilitating agricultural GHG emissions reductions.

The ombudsman will facilitate implementation of the agriculture-related CAP measures and will develop implementation plans for each defined action. The ombudsman will track the level of implementation achieved and report on existing successes, challenges, and opportunities encountered.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Allocate financial resources to reestablish and maintain the agricultural ombudsman position. | Medium Term (3-5 years) | Agriculture Department |
| **B** | Develop implementation plans for CAP agriculture sector actions. | Short Term (1-2 years) | Agriculture Department |
| **C** | Prepare an annual report on implementation status of CAP agriculture sector actions. | Medium Term (3-5 years) | Agriculture Department |
| **Related General Plan Policies** | | | |
| **AG.I-16:** Develop marketing/ombudsman and planning functions that facilitate and promote agriculture in the county. | | | |

**GHG Reduction Potential**

*Supporting Measure*

**Community Benefits:**

**Cost to County**

*Medium*

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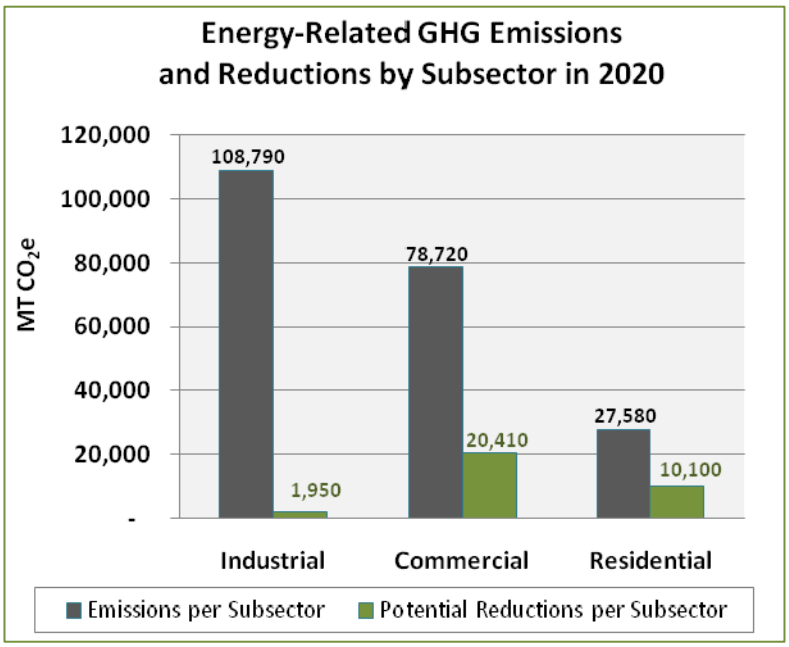
# Energy and Efficiency

## OBJECTIVE: MINIMIZE ENERGY CONSUMPTION, INCREASE ENERGY EFFICIENCIES, AND TRANSITION TO CLEAN RENEWABLE ENERGY SOURCES.

Substantial opportunity exists to reduce energy-related GHG emissions within Solano County. Natural gas and electricity used in homes, businesses, and farms comprises approximately 38% of the 2005 baseline GHG inventory. Industrial processes generate almost three quarters of these emissions. Residential and commercial energy consumption for heating, cooling, lighting, appliances, and equipment operation contributes the remainder.

The three primary strategies to reduce the County's energy-related emissions are energy efficiency, renewable energy generation, and reducing the carbon content of the grid's electricity generation portfolio.[i] Energy efficiency improvements in buildings, appliances, and equipment are an effective way to reduce energy demand and lower utility bills. Most buildings within the unincorporated county were built before the adoption of the California Energy Code (Title-24) in 1978. Efficiency upgrades to these structures will create important emissions reductions. Incorporating efficient designs and technologies in new construction and remodels will also minimize future emissions.




Note: The commercial sector includes government-related reductions, and some reductions that are applicable to both, the commercial and industrial sectors.

Encouraging residents and businesses to install renewable energy systems on buildings, parking lots or other areas could reduce considerable emissions. Photovoltaic, solar hot water heaters and wind turbines represent major opportunities in the County.

Pacific Gas and Electric (PG&E) currently provides electricity and natural gas to the unincorporated county. In 2007, fossil fuels generated 45% of PG&E's electricity. Increasing the percentage of electricity from renewable sources would reduce the community's electricity-related GHG emissions. State regulations require utilities to increase the percentage of renewable electricity in their generation portfolios over the next decade. Developing a community choice aggregation program would give the County greater control over the amount of renewable or low-carbon electricity within the generation portfolio.

**GHG Reduction Potential**

**32,460 MT $CO_2$/yr**

## WIND ENERGY GENERATION IN SOLANO COUNTY

Solano County's exceptional wind energy resources and location adjacent to existing electricity transmission networks and major urban populations provide ideal conditions for existing and future wind energy generation. These facilities contribute to the State's renewable energy and GHG emission reduction efforts.

California's renewable energy portfolio standard (RPS) requires that 33% of electricity be generated from renewable sources (e.g., winds, solar, biomass, geothermal, small scale hydroelectric) by 2020. If achieved, this increase in renewable energy will considerably reduce statewide GHG emissions.

To achieve the RPS goal, renewable generation will need to be greatly expanded. Solano County's accommodation of wind energy facilities will directly assist achievement of the RPS and AB 32 GHG emission reduction goals. The County will continue to support appropriate wind energy facilities within its jurisdiction.

In 2004, wind energy provided 3,573 gigawatt-hours (GWh) or 1.5% of California's electricity. Solano County's wind turbines contributed 102 GWh, or 2.9% of this generation capacity (see Table 3-3). Existing projects will expand generation to 600 GWh, making Solano County one of the major providers of wind power in the state. With added impetus from the RPS, additional investment in wind energy is expected. Solano County is well-suited to take advantage of this development.

Wind energy produced in Solano County makes up only a small portion of the energy actually used within the county. The majority of wind-generated power is fed into the electrical grid and is purchased by utilities throughout California. For this reason, current wind energy generation does not provide GHG emission reductions within the CAP. If the County developed a community choice aggregation program (see measure E-1), the program could purchase a portion of its power from new, local wind energy facilities. These purchases would provide effective GHG emission reductions.

**Table 3-3:**
**Wind Energy Generation in California**

| Area | Capacity (MW) | Generation (GWh) | Number of Turbines | % of State Total Wind Generation |
|---|---|---|---|---|
| Solano County | 165 | 102 | 700 | 2.9% |
| Altamont Pass | 576 | 1,071 | 4,788 | 29.9% |
| Pacheco Pass | 16 | 25 | 167 | 0.7% |
| Tehachipi | 710 | 1,482 | 3,444 | 41.5% |
| San Gorgonio | 413 | 893 | 2,556 | 24.9% |
| **State Total** | **1,880** | **3,573** | **11,655** | **100.0%** |

Notes: MW – Megawatts, GWh – Gigawatt hours.
Source: California Energy Commission 2003

## COMMUNITY CHOICE AGGREGATION

**E-1: Investigate the potential to establish a countywide community choice aggregation program and increase the community's use of locally produced renewable energy.**

*Measure Description:*

Assembly Bill 117, which was signed into law in 2002[ii], enables California cities and counties, either individually or collectively, to supply electricity to customers within their borders through the establishment of a community choice aggregation program (CCA).[iii] Unlike a municipal utility, a CCA does not own the transmission and delivery systems, but is responsible for providing electricity to its constituent residents and businesses. The CCA may own electric generating facilities, but more often, it purchases electricity from private electricity generators. A key benefit of a CCA is that the participating jurisdiction(s) can determine the amount of renewable energy contained within the generation portfolio. Marin County, Sonoma County, Humboldt County and the City of San Francisco are in various stages of implementing a CCA. Developing a CCA will require a detailed analysis of energy demand, efficiency opportunities, and renewable generation opportunities in the unincorporated county. Using existing models from other counties is likely to reduce the initial program design costs. The program would be most effective if the County partnered with Solano County cities and other jurisdictions and established a stakeholder advisory group.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Develop a preliminary feasibility study to determine potential for and benefits of a community choice aggregation program in Solano County. Analyze energy production costs and establish a stakeholder advisory group. | Medium Term (3-5 years) | Resource Management |
| **B** | Identify partners among Solano County cities and other jurisdictions for a Countywide CCA program. | Medium Term (3-5 years) | Resource Management |
| **C** | If a community choice aggregation program is determined to be feasible, develop a detailed business plan that identifies organization, governance, rate structure, enrollment, electric resources, a financial plan, and implementation schedule for the proposed CCA. | Medium Term (3-5 years) | Resource Management |
| **D** | Develop a CCA implementation plan and submit to the California Public Utilities Commission as required by AB 117 (2002). | Medium Term (3-5 years) | Resource Management |

**GHG Reduction Potential ($MT CO_2e/yr$):**

***23,170***

**Community Benefits:**

**Cost to County**

*High*

| Performance Indicator | | Target |
|---|---|---|
| **i** | Unincorporated county consumers participating in a 65% renewable CCA | 50% by 2020 |
| **Ii** | Unincorporated county consumers participating in a 100% renewable CCA | 30% by 2020 |
| **Related General Plan Policies and Implementation Programs** | | |
| **RS.I-61:** Investigate the feasibility and benefit of establishing a Community Choice Aggregation program by analyzing energy production costs and by establishing a stakeholder advisory group. | | |

## COMPREHENSIVE RENEWABLE ENERGY PROGRAM

**E-2: Develop a comprehensive renewable energy program that provides outreach, financing, and other forms of assistance to residential, commercial, agricultural, and industrial uses.**

*Measure Description:*

Solano County will develop a comprehensive renewable energy program that encourages homeowners and building owners to install solar hot water and solar photovoltaic systems through outreach, low-cost financing, and permit streamlining. Outreach efforts will aim to maximize community and business participation. To encourage participation from residential homeowners, the County will leverage *Energy Upgrade California's* outreach materials and online platform. The County can also use materials from the California Solar Initiative, as well as qualified solar financing and installation companies to reach out to commercial, industrial, and agricultural building owners. The County will identify an online calculator that provides residents and building owners with an estimate of the costs or savings associated with solar systems, and will link that calculator to its web page[iv].

Financing is critical to the success of the renewable energy program. The County is participating in the *Energy Upgrade California* program, which also provides rebates and incentives for renewable energy systems. Funding for this effort comes from the American Recovery and Reinvestment Act (ARRA, also known as federal stimulus funds), California utility ratepayers, and private contributions. Energy upgrade rebates are administered by participating utilities. The program will pay the installation cost of a renewable energy system for approved applicants. Property owners will be able to finance the renewable systems by using this program in conjunction with the California Solar Initiative rebate program.

To further facilitate participation, the County will streamline the permit process for system installation. The County will create a specific solar installation permit and only include submittal requirements directly related to solar systems. Additionally, renewable energy educational messages will be included in County mailings and at public facilities, as well as through normal County inspections. The County will also develop agreements with businesses and community organizations to prepare and distribute articles, mailings, and presentations on renewable energy.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Identify methods to expand renewable energy production in the county. Methods may include incentives such as expedited permit processing, | Short Term (1-2 years) | Resource Management |

**GHG Reduction Potential (MT $CO_2e$/yr):**

***4,080***

**Community Benefits:**

**Cost to County**

*Medium*

| | | | |
|---|---|---|---|
| | reduced fees, and technical assistance to encourage renewable energy technology and practices. | | |
| **B** | Work with ABAG to develop and implement the Energy Upgrade California program, which will provide access to financing for residential renewable energy systems. | Short Term (1-2 years) | Resource Management |
| **C** | Participate in the Energy Upgrade California program to encourage investments in renewable energy for existing residential buildings. | Short Term (1-2 years) | Resource Management |
| **D** | Develop an outreach program to maximize installation of solar hot water systems in residential buildings. | Short Term (1-2 years) | Resource Management |
| **E** | Work with solar installers to develop free solar audits for interested property owners. | Short Term (1-2 years) | Resource Management |
| **F** | Streamline permitting (e.g., building, electric, plumbing) for photovoltaic and solar hot water system installations. | Short Term (1-2 years) | Resource Management |

| **Performance Indicator** | | Target |
|---|---|---|
| **i** | Percentage of building owners that have installed a renewable energy system. | 5% Solar PV by 2020<br>30% Solar Hot Water by 2020 |

**Related General Plan Policies and Implementation Programs**

**RS.I-60:** Conduct studies that identify methods to expand renewable energy production in the county. Methods may include incentives such as expedited permit processing, reduced fees, and technical assistance to encourage energy efficiency technology, research, and practices.
**RS.I-58:** Protect the viability of renewable energy generation within the county by protecting resources such as solar access on buildings and high value wind energy sites. Facilitate the development of renewable energy generation in the county through the provision of streamlined permitting processes.
**RS.P-50:** Provide incentives for city and county residents and businesses to produce and use renewable sources of energy.
**RS.P-53:** Enable renewable energy sources to be produced from resources available in Solano County, such as solar, water, wind, and biofuels to reduce the reliance on energy resources from outside the county.
**RS.P-59:** Encourage on-site renewable energy production and use and energy conservation measures.

## Energy Efficiency Program

**E-3: Develop a comprehensive energy efficiency program that provides outreach, financing, and other forms of assistance to residential, commercial, agricultural, and industrial uses.**

*Measure Description:*

Many synergies exist between the comprehensive renewable energy program described in Measure E-2 and the comprehensive energy efficiency program described here. Many daily program operations will be shared between the two programs. They are described separately in order to address the distinct GHG emissions reduction mechanism involved and to emphasize the importance of each component.

The focus of the energy efficiency program is greater use of energy efficient, low-carbon, or renewable technologies in retrofits and existing buildings, primarily achieved through outreach and education. The County will promote the existing federal weatherization program which reduces the heating and cooling costs for low-income families by improving the energy efficiency of their homes and ensuring their health and safety. Among low-income households, the program focuses on elderly residents, individuals with disabilities, and families with children. This measure also provides assistance and incentives for energy efficiency upgrades for small businesses. California's small and medium-sized businesses consume roughly 18% of all commercial energy in the state. Much of that energy is wasted by inefficient equipment and lighting, providing opportunities for increased efficiencies and cost savings.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Encourage energy efficiency retrofits and the use of energy efficient, low-carbon, or renewable technologies through education and outreach. | Short Term (1-2 years) | Resource Management |
| **B** | Develop an outreach program to encourage participation in the US Department of Energy (DOE)'s Weatherization Assistance Program by eligible low-income households. | Short Term (1-2 years) | Resource Management |
| **C** | Implement a small business energy savings assistance program that provides retrofit services including technical assistance and incentives for energy efficiency upgrades (e.g., refrigeration, HVAC, lighting). | Medium Term (3-5 years) | Resource Management |
| **Performance Indicator** | | Target | |
| **i** | Percentage of building owners that have performed an energy efficiency retrofit achieving 10% improvement from 2005 efficiency. | 40% of Residential by 2020<br>50% of Low-Income by 2020 | |

**GHG Reduction Potential (MT $CO_2e$/yr):**

***1,660***

**Community Benefits:**

**Cost to County**

*Low-Medium*

**Related General Plan Policies and Implementation Programs**

**RS.P-49:** Ensure energy conservation and reduced energy demand in the county through required use of energy-efficient technology and practices.
**RS.P-51:** Promote Solano County as a model for energy efficiency and green building.
**RS.P-56:** Provide information, marketing, training, and education to support reduced energy consumption, the use of alternative and renewable energy sources, green building practices, recycling, and responsible purchasing.
**RS.I-59:** Promote public awareness of energy conservation and efficiency through the development of a publicity program. This program shall include information describing how residents can retrofit existing homes for increased energy efficiency. Encourage the use of low-carbon and renewable fuels and zero emissions technologies.

## GREEN BUILDING AND ENERGY EFFICIENCY

**E-4: Adopt green building and energy efficiency ordinances to require green building practices, programs and design elements.**

*Measure Description:*

Increasing the energy efficiency of new and retrofitted residential and commercial buildings will reduce energy consumption and generate savings that could considerably reduce homeowner and business energy bills. California Energy Code requirements (Title 24) are the base mandatory energy efficiency standards for residential and non-residential construction in Solano County. The California Green Building Standards Code (GBC), effective in 2011, provides local jurisdictions an option to adopt an energy efficiency standard that surpasses the State's basic requirements. Solano County will adopt an energy efficiency ordinance requiring all new construction in the unincorporated County to meet the GBC's Tier I level, which requires new construction to exceed Title 24 energy efficiency requirements by 15%.

Additionally, the County will develop and adopt a green building ordinance that builds on current rating systems such as the U.S. Green Building Council's LEED™ rating system; Built-it-Green's GreenPoint rated system; or the EPA's Energy STAR system.

In addition to these energy performance standards, new buildings should maximize passive solar energy design, natural ventilation, effective use of daylight, and the potential for on-site solar generation, where possible.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Adopt an energy efficiency ordinance requiring all new construction and remodels to achieve California Green Building Code Tier I Energy Efficiency Standards (Section 503.1.2). | Short Term (1-2 years) | Resource Management |
| **B** | Adopt a green building ordinance that requires: a) disclosure of building energy consumption related to countywide averages at point of sale or lease; b) all new commercial, office, and institutional buildings over 10,000 square feet in size to meet or exceed LEED certification or equivalent standard; and c) the design and orientation of all buildings to maximize passive solar heating during cool seasons, avoid solar heat gain during hot periods, enhance natural ventilation, and promote effective use of daylight. | Short Term (1-2 years) | Resource Management |
| **Performance Indicator** | | Target | |
| **i** | New residential units and commercial buildings exceeding Title 24 energy performance by 15%. | 100% by 2020 | |

**GHG Reduction Potential (MT $CO_2e$/yr):**

***270***

**Community Benefits:**

**Cost to County**

*Low*

**Related General Plan Policies and Implementation Programs**

**RS.I-46:** Require residential development of more than six units to participate in the California Energy Commission's New Solar Homes Partnership and to construct LEED-certified units or meet equivalent performance standards. For new affordable housing projects, performance standards shall be established pursuant to the requirements of the funding source(s). Require new construction or major renovation of commercial and industrial buildings over 10,000 square feet in size to incorporate renewable energy generation to provide the maximum feasible amount of the project's energy needs. Commercial buildings shall incorporate renewable energy generation to provide at least 20 percent of the project's needs.

**RS.I-47:** Require the use of Energy Star rated appliances and the most energy-efficient Energy Star rated water heaters and air conditioning systems that are feasible in the construction of new homes, in all substantial remodels when appliances are being replaced, and in any case where a permit is needed to install or replace appliances (e.g., water heaters, air conditioning).

**RS.I-48:** Require all commercial, institutional, and industrial development to reduce potential urban heat island effect by using U.S. EPA–Energy Star rated roofing materials and light colored paint, using light colored paving materials for internal roads and parking, and using shade trees to shade south and west sides of new or renovated buildings and to achieve a minimum of 50 percent shading for all parking lots surfaces. Continue to ensure compliance with existing state building requirements for energy-conserving roofing materials on nonresidential buildings in new construction and reroofing. Amend the County Zoning Ordinance to encompass these requirements.

**RS.I-51**: Adopt a County "green building program." Require all new and renovated commercial, office, and institutional buildings over 10,000 square feet in size to achieve LEED certification, or meet equivalent performance standards. Amend the County Zoning Ordinance to encompass these green building requirements. Provide permitting-related and other incentives for building projects that exceed the County's energy efficiency standards by greater than 5 percent.

**RS.I-52:** Require that development projects use landscaping and site design techniques that minimize energy use. These may include designing landscaping to shield or expose structures to maximize energy conservation or acquisition; and taking advantage of orientation, sun-shade patterns, prevailing winds, landscaping, and sunscreens. Amend development standards to require such techniques.

**RS.I-55:** Require the design and orientation of all buildings to maximize passive solar heating during cool seasons, avoid solar heat gain during hot periods, enhance natural ventilation, and promote effective use of daylight. Orientation should optimize opportunities for on-site solar generation.

## FOOD WASTE-TO-ENERGY BIOMASS FACILITY

**E-5: Work with Cal Recycle, Bay Area waste agencies, other jurisdictions, and interested private sector parties to develop an agricultural and food waste-to-energy biomass facility in Solano County.**

*Measure Description:*

Solano County is ideally suited as a location for a food waste-to-energy biomass facility. The county's close proximity to major population centers and food processors provides considerable waste stock. Locating the biomass facility adjacent to existing railroad tracks would also minimize transportation emissions associated with waste hauling. The County's large number of farms could incorporate the digestate into current and future agricultural practices.

Biomass facilities convert organic wastes such as food scraps and agricultural refuse into a nutrient-rich liquid fertilizer and biogas, a renewable fuel source for electricity generation and heat energy. When microorganisms digest organic wastes in environments with little oxygen (i.e., landfills) they release methane, a potent GHG that traps heat at 23 times the rate of carbon dioxide. A food waste biomass facility is a waste management solution that captures the methane before it is released into the atmosphere. The methane is then available to generate electricity in a gas turbine and/or to provide heat energy for industrial processes. After the biomass facility extracts methane from the waste, the remaining material, referred to as digestate, can be used as a soil conditioner in agriculture or as an industrial ingredient.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Identify potential partners for an agricultural and food waste biomass facility. | Short Term (1-2 years) | Resource Management |
| **B** | Conduct a feasibility study to determine potential of a biomass facility project in Solano County; review potential locations near other industries that could benefit from energy, by-products and heat generated by the facility. | Medium Term (3-5 years) | Resource Management |
| **C** | Develop an implementation plan to develop a biomass facility prior to 2020. | Medium Term (3-5 years) | Resource Management |
| **Performance Indicator** | | Target | |
| **i** | Develop Biomass Facility for a minimum of 3,518 short tons of agricultural by-products/residue and /or municipal solid waste a year. | 20% plant efficiency heat-to-electricity by 2020. | |

**GHG Reduction Potential (MT $CO_2e$/yr):**

***380***

**Community Benefits:**

**Cost to County**

*Medium*

**Related General Plan Policies and Implementation Programs**

**PF.I-5:** Work with the owners and operators of methane-producing facilities (e.g., landfills, dairies, wastewater treatment plants) to establish methane recovery and electricity generation systems.

**PF.P-28:** Promote technologies that allow the use and reuse of solid waste, including biomass or biofuel as an alternative energy source.

## INDUSTRIAL AND PROCESS ENERGY EFFICIENCY

**E-6: Partner with Solano Economic Development Corporation, Pacific Gas & Electric, and agricultural processing and industrial energy businesses to increase building and process energy efficiency.**

*Measure Description:*

There are numerous opportunities for energy savings in most industrial and agricultural facilities. Some energy efficiency improvements can be made with little or no investment, while others require a larger initial investment but can pay for themselves quickly. Energy use often accounts for the majority of the cost of industrial and agricultural equipment over its lifetime, so it is usually cost-effective to invest in efficient equipment. Efficiency projects can provide additional benefits, including improved work environments, increased productivity, and reduced maintenance costs. The benefits of energy efficiency improvements depend on a number of facility-specific factors, but some opportunities may include: motor efficiency; heating and cooling; efficient appliances; system optimization; building-pressure balance; heat recovery; lighting design and controls; leak repair and maintenance; compressed air uses; compressors and variable frequency drives.

The County will help agricultural and industrial businesses identify and implement the most cost-effective approach to achieving higher levels of energy efficiency through educational workshops, promoting existing incentives, and a an energy efficiency requirement for construction of new industrial or agricultural processing facilities.

| | Action | Timetable | Responsibility |
|---|---|---|---|
| **A** | Contact agricultural processing and industrial businesses regarding existing energy efficiency rebates, incentives, and audits. | Short Term (1-2 years) | Resource Management |
| **B** | Develop industry specific energy efficiency educational workshops and provide updates regarding emerging cost and energy saving technologies. | Short Term (1-2 years) | Resource Management |
| **C** | Require new agricultural processing and industrial construction and retrofit projects to consult with PG&E or other industrial energy efficiency experts for design assistance and engineering support. | Short Term (1-2 years) | Resource Management |
| **Performance Indicator** | | Target | |
| **i** | Percentage of industrial and agricultural processing facilities that increase energy efficiency by 15%. | 5% by 2020 | |

**GHG Reduction Potential: (MT $CO_2e$/yr):**

***730***

**Community Benefits:**

**Cost to County**

*Low-Medium*

**Related General Plan Policies and Implementation Programs**

**RS.P-49:** Ensure energy conservation and reduced energy demand in the county through required use of energy-efficient technology and practices.

**RS.P-59:** Encourage on-site renewable energy production and use and energy conservation measures.

## Eco-Agriculture and Food Processing Park

**E-7: Work with Solano Economic Development Corporation and cities to establish an eco-agriculture and food processing park that incorporates industrial ecology, renewable energy generation, and zero-waste practices.**

*Measure Description:*

In an eco-agricultural and food processing park, businesses cooperate with each other and with the local community to reduce waste and pollution, efficiently share resources (such as information, materials, water, energy, infrastructure and natural resources), increase economic gains and improve environmental quality – all while achieving sustainable development goals. By applying basic strategies derived from the more well developed concept of eco-industrial parks regarding site selection and development, building standards, and other related factors, this endeavor can build on the opportunity for profitable by-product flows between tenants, which are particularly high in Solano County with the biomass, energy, and water intensive food processing companies desiring to locate in the county. If a new agricultural processing facility is developed in areas served by renewable energy, this could reduce or eliminate new industrial electricity (and possibly natural gas) consumption. Also, the biomass facility described in measure E-5 would be an ideal facility to be located near or connected to the eco-agricultural and food processing park. This park would ideally be located in one of the areas designated Industrial in the 2008 General Plan, including sites northeast of Dixon, north of Vacaville along I-505, or east of Fairfield at the Lambie Road Industrial Park.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Perform a market analysis to determine the level of interest within the agricultural/food processing industry for an eco-agricultural and food processing-park in Solano County. | Medium Term (3-5 years) | Resource Management |
| **B** | Evaluate Industrial-designated areas of the unincorporated County and determine an optimal location for an eco-agricultural and food processing park close to work force and transit options. | Medium Term (3-5 years) | Resource Management |
| **C** | Work with interested businesses and industrial ecology experts to develop design guidelines for the eco-agricultural and food processing park. | Medium Term (3-5 years) | Resource Management |

**Related General Plan Policies and Implementation Programs**

**RS.P-53:** Enable renewable energy sources to be produced from resources available in Solano County, such as solar, water, wind, and biofuels to reduce the reliance on energy resources from outside the county.

**RS.P-59:** Encourage on-site renewable energy production and use and energy conservation measures.

**GHG Reduction Potential (MT $CO_2e$/yr):**

*Supporting Measure*

**Community Benefits:**

**Cost to County**

*Medium*

## Energy Efficiency in County Operations

**E-M1: Reduce total energy consumption in County facilities cost-effectively by 20% by 2020.**

*Measure Description:*

The County will reduce total energy consumption in County facilities by 20% by 2020 (against 2005 baseline for all County facilities), through building energy audits to identify and implement the most cost-effective energy conservation measures. The cost of these audits depends greatly on the complexity of the building energy systems and the building's size, but range from $0.18 to $0.50 per square foot for a comprehensive audit. The cost of implementing energy conservation measures is also variable and depends on financing. One popular financing mechanism is energy performance contracting, – a contractual arrangement under which an Energy Service Company (ESCO) implements an energy efficiency project and uses the stream of income from the cost savings to repay the costs of the project.

Solano County has been taking many steps to maximize energy efficiency in its facilities. This measure accounts for many of these efforts and outlines additional efficiency options, like integrating smart grid technologies to ensure optimal process load efficiency in County facilities. The costs for smart-grid technologies are highly variable depending on type of new technology required. For instance, the average per unit cost for energy controls ranges from $500 to $2,000. This technology is rapidly emerging, however, and many major appliances are just entering the market, providing additional cost-effective opportunities.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Conduct an energy efficiency audit of targeted County facilities. | Short Term (1-2 years) | General Services |
| **B** | Implement cost-effective upgrades identified in energy efficiency audits. | Short Term (1-2 years) | General Services |
| **C** | Integrate Smart Grid technologies (e.g., major appliances, performance monitoring displays) into County facilities. | Medium Term (3-5 years) | General Services |
| **D** | Reduce hours of operation of lights and unnecessary lights in County buildings and properties. | Short Term (1-2 years) | General Services |
| **Performance Indicator** | | Target | |
| **i** | Percentage of total energy consumption reduction in County facilities. | 20% by 2020 | |

**GHG Reduction Potential (MT $CO_2e$/yr):**

***1,040***

**Community Benefits:**

**Cost to County**

*Medium*

**Related General Plan Policies and Implementation Programs**

**RS.I-41:** Require that all new County buildings and major renovations and additions achieve LEED certification or meet equivalent performance standards. A LEED Silver certification level and reduced operational costs are preferred outcomes.

**RS.I-45:** Execute an Energy Savings Performance Contract with a private entity to retrofit public buildings. This type of contract allows the private entity to fund all energy improvements in exchange for a share of the energy savings over a period of time.

**RS.P-49:** Ensure energy conservation and reduced energy demand in the county through required use of energy-efficient technology and practices.

**RS.P-51:** Promote Solano County as a model for energy efficiency and green building.

**RS.P-59:** Encourage on-site renewable energy production and use and energy conservation measures.

## Renewable Energy in County Operations

**E-M2: Increase the use of renewable energy in County operations.**

*Measure Description:*

The County will increase the amount of electricity used for county operations that comes from local renewable energy facilities to a minimum of 50 percent. To achieve this, the County must determine an appropriate renewable energy acquisition plan, in order to ensure that the most cost-effective strategies are employed to meet this General Plan policy. This plan could leverage a number of strategies that have been viable in other municipalities and local jurisdictions, including: competitive solicitation of energy supply that incorporates a percentage of renewable energy generation; creation of a set-aside escrow fund for the purchase of small-scale technologies and energy efficiency; or construction of larger renewable facilities that will provide power to municipal loads. The County will develop a detailed implementation plan and conduct a financial feasibility analysis to determine the best strategies for Solano County, with the aim of enabling renewable energy to be a sustainable part of the energy supply needs for County facilities.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Require all County operations to use renewable energy for 50 percent or more of their energy needs. | Short Term (1-2 years) | General Services |
| **B** | Conduct a financial analysis of options to increase renewable energy (e.g., power purchase agreement, development of County-owned renewable energy generation facilities). | Medium Term (3-5 years) | General Services |
| **Performance Indicator** | | Target | |
| **i** | Locally-generated renewable energy used for County operations. | 50% by 2020 | |
| **Related General Plan Policies and Implementation Programs** | | | |
| **RS.I-40:** Require all County operations to use renewable energy for 50 percent or more of their energy needs. | | | |

**GHG Reduction Potential ($MT CO_2e/yr$):**

***1,130***

**Community Benefits:**

**Cost to County**

*Medium*

[i] Pacific Gas and Electric (PG&E) is currently the County's energy utility. In 2007 renewable energy facilities including solar, geothermal, and biomass provided 14% of the total supply. Hydroelectric generation provided 18% and nuclear plants provided 23%. Natural gas facilities provided 42% and coal provided three percent (Silverman 2007).

[ii] http://www.leginfo.ca.gov/pub/01-02/bill/asm/ab_0101-0150/ab_117_bill_20020924_chaptered.html

[iii] http://www.lgc.org/cca/docs/cca_energy_factsheet.pdf

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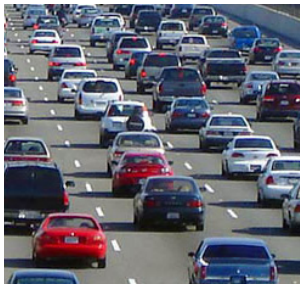
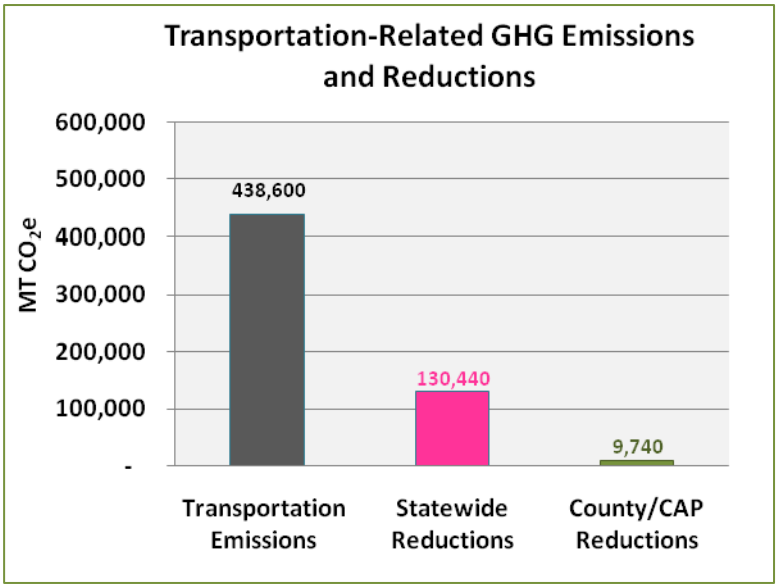
# Transportation and Land Use



### OBJECTIVE: SUPPORT A TRANSPORTATION SYSTEM AND LAND USE PATTERN THAT PROMOTES CARPOOLING, WALKING, BIKING, AND USING PUBLIC TRANSIT.

Transportation-related emissions make up the largest portion (51%) of Solano County's existing emissions. (The inventory only includes emissions from vehicle trips that originate and/or end within unincorporated areas of the County. Pass-through trips, such as vehicles driving from San Francisco to Sacramento on I-80, are excluded due to the fact the County has no ability to influence these emissions.) Vehicle fuel efficiency, fuel carbon content, vehicle operations, and the number of miles driven all influence the amount of transportation emissions generated in a community. State-mandated technological changes in fuel efficiency and reductions to fuel carbon content will help reduce these emissions. While these reductions are important, additional local actions will be required. The County, in partnership with the Solano Transportation Authority (STA), aims to reduce these emissions further by encouraging residents and employees to increase their use of alternative travel modes such as public transit, carpooling, bicycling and walking and by promoting eco-driving and other fuel saving practices. The County recognizes that the scope and reduction potential of the alternative transportation measures are modest compared to measures often implemented in urban jurisdictions. The County's rural context creates numerous challenges for alternative transportation.




Land use patterns also have a strong effect on emissions. Where people live determines how far they have to travel to work, shopping, and other destinations, and influences whether they choose to walk, bike, use public transit, or drive. Solano County has a strong tradition of farmland preservation and locating urban residential and employment growth within the incorporated city borders. The County's Orderly Growth Initiative and other existing policies will help reduce emissions.

The County will facilitate live-work arrangements that will ease residents' need to commute for employment. The County will also expand efforts to protect natural habitat areas and plant trees, both of which can capture and store atmospheric carbon.

**GHG Reduction Potential**

**9,740 MT $CO_2$/yr**

## RIDESHARE INFRASTRUCTURE

**TC-1: Solano County will work with STA to enhance countywide rideshare infrastructure and services.**

*Measure Description:*

The County will work with STA and other agencies to expand ridesharing opportunities, including carpooling and vanpooling. Specifically, the County will work with partners to upgrade ride-matching systems to use current technologies (e.g., cell phone-enabled ridematch applications), and help develop a ridematch social networking website; online electronic payment options; and rideshare stations that provide covered shelter, lighting, and secured bicycle parking. Solano County will continue to promote existing programs and incentives including the Emergency Ride Home Program, Vanpool Passenger and Vanpool Start-Up Incentives, and Bike Commuter Incentives (e.g., up to $100 off a new bike)[i].

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Work with STA to develop a plan to update ride-match systems to the most advanced technologies. | Short Term (1-2 years) | Resource Management |
| **B** | Work with STA to provide a social networking platform for smart phone and computer use. | Short Term (1-2 years) | Resource Management |
| **C** | Work with STA to evaluate existing park-and-ride infrastructure and create new facilities, if deficiencies exist. | Short Term (1-2 years) | Resource Management |
| **D** | Work with STA to promote the guaranteed ride home program and other incentives offered to increase ridesharing and use of public transit. | Short Term (1-2 years) | Resource Management |
| **E** | Adopt an ordinance that requires new offices with 20 or more employees to provide preferential parking spaces for rideshare commuters. | Medium Term (3-5 years) | Resource Management |
| **F** | Work with STA to encourage employers to allow flexible work schedules and telecommuting. | Short Term (1-2 years) | Resource Management |
| **G** | Work with STA and SEDC to encourage employers to create rideshare databases for employees and employees of adjacent businesses. | Short Term (1-2 years) | Resource Management |
| **Performance Indicator** | | Target | |
| **i** | Increase in carpool mode share. | 5% by 2020 | |
| **ii** | Number of employers participating by creating rideshare databases and/or allowing flexible work schedules and telecommuting. | 20% by 2020 | |
| **Related General Plan Policies and Implementation Programs** | | | |
| **RS.P-54:** Reduce Solano County's reliance on fossil fuels for transportation and other energy-consuming activities.<br>**TC.I-4:** Work with STA to offer financing programs for the purchase or lease of vehicles used in employee ridesharing programs. | | | |

**GHG Reduction Potential (MT $CO_2e$/yr):**

***7,940***

**Community Benefits:**

**Cost to County**

*Low*

## PUBLIC TRANSIT

**TC-2: Work with STA to increase public transit ridership by expanding express bus service and improving transit stop amenities and transit connections.**

*Measure Description:*

Making transit more accessible and convenient can facilitate higher levels of transit use. The County will work with STA to continue to increase express bus services and increase transit stop/station amenities and connectivity. To facilitate this, the County will work with STA to conduct an express bus service survey to determine express service demand and service gaps.

The County will also work with STA and transit providers to enhance bus stop and train station amenities (i.e., shade, weather protection, seating, lighting, and route information) for riders. The County will also work with STA and Solano Economic Development Commission (SEDC) to identify potential for collector bus services that would link Solano County employment centers to rail and express bus stations. These collector bus services would ideally be funded through employer Transportation Demand Management programs or using State/federal funds.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Work with STA to conduct a survey of residents and employees to determine the need for additional express bus service and routes. | Short Term (1-2 years) | Resource Management |
| **B** | Work with STA to provide transit-supporting improvements including shelters, route information, benches, and lighting. | Medium Term (3-5 years) | Resource Management |
| **C** | Work with STA and SEDC to identify potential for collector bus services that would link Solano County employment centers with rail and express bus stations. | Medium Term (3-5 years) | Resource Management |
| **Performance Indicator** | | Target | |
| **i** | Increase in transit mode (i.e., bus, rail, ferry). | 1% by 2020 | |

**Related General Plan Policies and Implementation Programs**

**TC.P-14:** Encourage the development of transit facilities and operations along major corridors to connect the county with surrounding activity centers and regional destinations.
**TC.I-13:** Support development of transit facilities in strategic locations such as at interchanges and in areas of concentrated activity.
**TC.P-18:** Encourage the expansion of passenger rail service through additional trains, new stations, and faster speeds to connect the county with other communities in the Bay Area and the Sacramento area.
**TC.P-19**: Work with STA to develop strategies to remove barriers and increase commuter ridership on Amtrak passenger rail, including, but not limited to, collector bus services, bicycle and pedestrian routes to stations, bicycle parking facilities at stations, and promotional campaigns.

**GHG Reduction Potential (MT $CO_2e$/yr):**

***1,000***

**Community Benefits:**

**Cost to County**

*Low*

## Bicycle and Pedestrian Connections

**TC-3: Work with cities and STA to improve bicycle and pedestrian connectivity in the county.**

*Measure Description:*

The 2004 Solano County Bicycle Plan aims to, "enable safe and efficient bicycle traveling as an everyday means of transportation in Solano County"[ii]. As of 2009, the regional intra-city bikeway system provided 130 miles of bikeways. The Bicycle Plan directs an additional 60 miles to be constructed. STA also prepared the Yolo-Solano BikeLinks map, which designates the suitability of many of the roads in Solano County for cycling. The 2004 STA Countywide Pedestrian Plan directs future investment in pedestrian infrastructure. The County will continue to pursue the completion of these improvements and examine additional infrastructure needs to improve bicycle and pedestrian access and safety.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Pursue completion of the unincorporated County's share of Bicycle Master Plan and Pedestrian Plan improvements by pursuing roadway-improvement project funding. | Long Term (5-10 years) | Resource Management, STA |
| **B** | Develop a "Share-the-Road" signage and outreach program to reduce bicycle/auto conflicts at key locations. | Short Term (1-2 years) | Resource Management |
| **Performance Indicator** | | Target | |
| **i** | Increase in pedestrian and bicycle mode share and resulting decrease in single occupancy vehicle mode share. | 0.5% by 2020 | |
| **Related General Plan Policies and Implementation Programs** | | | |
| **TC.I-8:** Adopt road construction standards that account for the needs of pedestrians, bicyclists, and transit.<br>**TC.P-24:** In collaboration with other agencies and cities, continue to plan, design, and create additional bikeways and bikeway connections to provide intercity and intercounty access and incorporate system needs when approving adjacent developments.<br>**TC.P-25:** Encourage access to open space and recreation through the development of safe, convenient, and connected walking paths, trails, bikeways, and neighborhood-based parks and recreation options.<br>**TC.P-26**: Accommodate pedestrians and bicyclists in the design and construction of roadway improvements on County facilities.<br>**TC.I-23:** Support applications to fund new bicycle and pedestrian facilities that close gaps in the system.<br>**TC.I-25**: Require projects to facilitate bicycle and walking access when feasible. Adopt development standards and design guidelines that support such access.<br>**TC.I-27:** Continue to participate in the Safe Routes to School program. | | | |

**GHG Reduction Potential (MT $CO_2e$/yr):**

***500***

**Community Benefits:**

**Cost to County**

*Low*

## Fuel Efficiency Public Outreach

**TC-4: Educate residents and businesses about options to reduce motor vehicle emissions.**

*Measure Description:*

The way people operate their vehicles has a substantial effect on the amount of motor vehicle-related GHG emissions generated in the community. In collaboration with STA, the County will create an outreach program to educate residents and businesses about ways to reduce vehicle emissions. The program will provide information and resources regarding ways to reduce fuel consumption through practices such as eco-driving, trip linking, and efficiency improvements (i.e., proper tire inflation) and will also identify where to find low or zero-emission vehicles and alternative fuels.

The program will provide educational outreach at public events, through County websites, and through an advertising campaign.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Work with STA to create an outreach program to provide information and resources regarding ways to reduce transportation costs and related emissions. | Short Term (1-2 years) | Resource Management |
| **B** | Work with STA to create a public advertisement campaign to encourage the purchase of hybrid or electric vehicles. | Medium Term (3-5 years) | Resource Management |

**Related General Plan Policies and Implementation Programs**

**RS.P-54**: Reduce Solano County's reliance on fossil fuels for transportation and other energy-consuming activities.

**TC.I-5**: In cooperation with STA, provide public education about options for reducing motor vehicle–related greenhouse gas emissions. Include information on trip reduction, trip linking, public transit, biking and walking, vehicle performance and efficiency, low- and zero-emissions vehicles, and ridesharing.

**GHG Reduction Potential ($MT CO_2e/yr$):**

*Supporting Measure*

**Community Benefits:**

**Cost to County**

*Medium*

## COUNTY FLEET MODERNIZATION

**TC-M1: Replace County vehicles with fuel efficient, electric, or alternative fuel vehicle models as the existing fleet is retired. (Emergency Vehicles are exempt, unless appropriate alternative vehicle options become available.)**

*Measure Description:*

The County will continue to modernize its fleet by replacing existing vehicles with fuel efficient, electric, and alternative fuel vehicle models to the degree that is financially viable. Vehicle replacement will occur as older vehicles are retired. The County will also evaluate opportunities to purchase smaller vehicles, where appropriate, to maximize GHG reductions and fuel cost savings.

Several funding opportunities exist for efficient fleet vehicle improvements including the Carl Moyer Program[iii] or the California Energy Commission's Alternative and Renewable Fuel and Vehicle Technology Program.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Improve the fuel efficiency of the County vehicle fleet by purchasing low or zero emission vehicles when vehicles are retired from service (Emergency vehicles exempt, unless appropriate alternative vehicle options become available.) | Short Term (1-2 years) | General Services |
| **B** | Replace existing County vehicles with alternative fuel vehicles such as electric, hybrid, natural gas, and fuel cell-powered vehicles. New County vehicles must be alternative fuel vehicles. | Medium Term (3-5 years) | General Services |
| **C** | Where feasible, include facilities in new County buildings to support the use of low/zero carbon vehicles. This may include charging stations for electric vehicles which use green electricity. | Short Term (1-2 years) | General Services |
| **Performance Indicator** | | Target | |
| **i** | Percent of County fleet vehicles that are 25% more fuel efficient than current vehicles. | 50% by 2020 | |
| **ii** | Traditional County fleet vehicles replaced with alternative fuel vehicles. | 20% by 2020 | |
| **Related General Plan Policies and Implementation Programs** | | | |
| **RS.I-42:** Replace existing County vehicles with alternative fuel vehicles such as electric, hybrids, natural gas, and fuel cell powered vehicles. New County vehicles must be alternative fuel vehicles. | | | |
| **RS.I-56:** Where feasible, include appropriate facilities in new buildings to support the use of low/zero carbon fueled vehicles. This may include charging stations for electric vehicles which use green electricity sources. | | | |

**GHG Reduction Potential ($MT CO_2e/yr$):**

***300***

**Community Benefits:**

**Cost to County**

*Medium*

## LIVE-WORK USES

**LU-1: Update the zoning ordinance to allow live-work uses in residential zones as long as such uses are compatible with existing community character.**

*Measure Description:*

Permitting residents to run appropriate businesses out of their homes can reduce commute trips and decrease emissions. The County will review the zoning ordinance to identify such opportunities, particularly within areas designated as Traditional Community and Urban Residential in the General Plan. The Traditional Community covers approximately 765 acres and the Urban Residential covers eight acres in the unincorporated areas of the County outside the city spheres of influence. There are thus a very limited number of places in the unincorporated County where this zoning change would have an effect, making it hard to quantify. However, the County does believe these zoning changes would provide opportunities for its residents.

The County will amend the ordinance to allow for live-work uses in these locations as applicable. Zone changes to allow live-work uses must ensure that these uses are compatible with existing community character.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Review the zoning ordinance to identify existing barriers to live-work uses in residential zones. Promote live-work uses, where compatible with existing community character. | Short Term (1-2 years) | Resource Management |
| **B** | Amend the zoning ordinance to allow land use patterns that facilitate shorter travel distances and non-auto modes of travel. | Short Term (1-2 years) | Resource Management |

**Related General Plan Policies and Implementation Programs**

**LU.P-39:** Promote live-work uses for professionals, artists, craftspeople and other low impact employment opportunities in Traditional Community areas as long as such uses are compatible with existing community character.

**TC.P-3:** Establish land use patterns that facilitate shorter travel distances and non-auto modes of travel, and limit the extent of additional transportation improvements and maintenance that may be needed with a more dispersed land use pattern.

**GHG Reduction Potential ($MT CO_2e/yr$):**

*Supporting Measure*

**Community Co-Benefits:**

**Cost to County**

*Very Low*

## LAND CONSERVATION

**LU-2: Protect and preserve forested areas, agricultural lands, wildlife habitat, and wetlands that provide carbon sequestration.**

*Measure Description:*

Carbon sequestration is the process through which carbon dioxide in the atmosphere is absorbed by trees, plants and crops through photosynthesis, and stored as carbon in plant biomass (tree trunks, branches, foliage and roots) and soils.

Solano County understands the importance of conserving and preserving its forests, agricultural land, wildlife habitat, and wetlands for the multiple benefits they provide, including carbon sequestration. The County will encourage willing landowners to protect these valuable resource lands and adopt practices that sequester carbon such as habitat restoration, hedgerows, and afforestation. The County will also provide outreach to landowners with sequestration potential about existing opportunities to participate in carbon markets.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Work with land trusts, mitigation banks, and other willing landowners to encourage practices that sequester carbon (i.e., habitat restoration, hedgerows, and afforestation). | Short Term (1-2 years) | Resource Management |
| **B** | Provide outreach regarding the potential for landowners to participate in carbon markets for carbon sequestration. | Short Term (1-2 years) | Resource Management |
| **C** | Promote free restoration and conservation planning through the Solano Resource Conservation District. | Short Term (1-2 years) | Resource Management |
| **Performance Indicator** | | Target | |
| **i** | Complete Zoning Ordinance revisions described in General Plan Implementation measure HS.I-3 (below) | Complete by 2020 | |

**Related General Plan Policies**

**HS.I-3**: Revise the County Zoning Ordinance to:

- limit activities that contribute to increased rates of surface water runoff, such as overgrazing by livestock, clearing, and burning, which can reduce natural vegetative cover;
- promote recreational, open space, and agricultural uses of upstream watershed areas, where appropriate;
- limit the construction of extensive impermeable surfaces and promote the use of permeable materials for surfaces such as driveways, streets, parking lots, sidewalks;
- require development in upstream watershed areas to follow best management practices for stormwater management, including on-site detention and retention basins, appropriate landscaping, and minimal use of impervious surfaces; and
- designate resource areas for preservation, including agriculture, wetlands, floodplains, recharge areas, riparian zones, open space, and native habitats.

**GHG Reduction Potential ($MT CO_2e/yr$):**

*Supporting Measure*

**Community Co-Benefits:**

**Cost to County**

*Very Low*

## TREE PLANTING

**LU-3: Protect oak woodlands and heritage trees and encourage the planting of native tree species in new developments and along road rights-of-way. Require the planting of shade and roadside trees in development projects.**

*Measure Description:*

Native trees, hedgerows, riparian areas and vegetation reduce carbon emissions and increase sequestration by contributing to improved efficiency of soil, water and climatic resources. In addition, they provide aesthetic benefits, habitat for many species, can reduce noise, and can play a significant role in the adaptation to climate change by improving the microclimate. Oak woodlands are well adapted to hot dry summers, don't require much irrigation and provide unique carbon sequestration benefitsiv.

The County will protect existing oak woodlands and will develop an outreach program to promote benefits of native trees and hedgerows to encourage planting for carbon sequestration purposes.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Protect and encourage planting of shade trees and hedge rows. | Short Term (1-2 years) | Planning Dept. |
| **B** | Develop an outreach program to promote shade trees for existing buildings and properties. Promote the benefits of wind-break trees and hedgerows for agriculture. | Medium Term (3-5 years) | Planning Dept. |
| **Related General Plan Policies and Implementation Programs** | | | |
| **RS.P-6:** Protect oak woodlands and heritage trees and encourage the planting of native tree species in new developments and along road rights-of-way. General Plan RS.P-6, RS.I-3, RS.I-5, RS.I-8<br><br>**RS.I-52:** Require that development projects use landscaping and site design techniques that minimize energy use. These may include designing landscaping to shield or expose structures to maximize energy conservation or acquisition; and taking advantage of orientation, sun-shade patterns, prevailing winds, landscaping, and sunscreens. Amend development standards to require such techniques. | | | |

**GHG Reduction Potential (MT $CO_2e$/yr):**

*Supporting Measure*

**Community Co-Benefits:**

**Cost to County**

*Low-Medium*

[i] www.solanolinks.com/commuterinfo or http://rideshare.511.org/rideshare_rewards/county.asp

[ii] *http://www.sta.dst.ca.us/pdfs/Plans/Final%20Bike%20Plan%20Goals%20and%20Objectives.pdf*

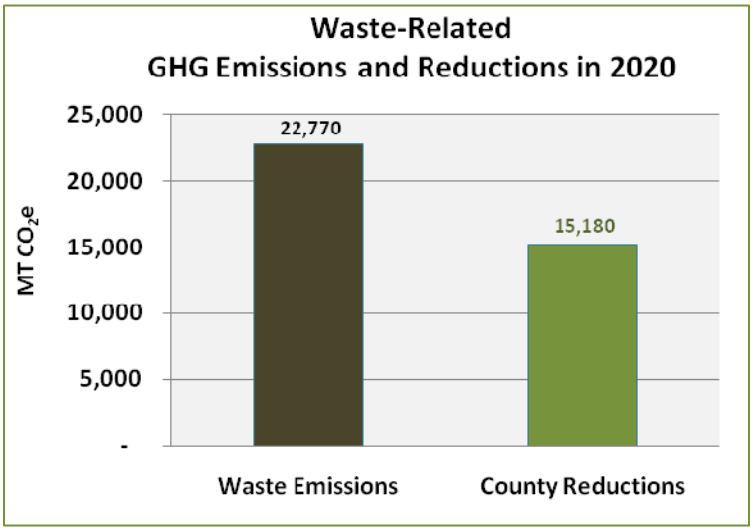
[iii] http://www.arb.ca.gov/msprog/moyer/guidelines/cmp_guidelines_part1_2.pdf

http://www.ca-ilg.org/SFBayClimate

# Waste Reduction and Recycling

## Objective: Develop a Zero-Waste Plan to Achieve 75% Diversion

Since 1990, Solano County has implemented a wide array of recycling and source reduction programs that have successfully diverted more than 60% of its waste stream from disposal. By 2005, the amount of solid waste discarded in landfills over the last two decades by unincorporated Solano County generated approximately 20,235 MT CO2e/yr of GHG emissions. In an effort to further reduce these emissions, the County will develop a zero-waste plan to achieve a 75% waste-diversion goal by 2020.




The principle of zero-waste is rooted in avoiding waste generation from the start. It requires a major mind-shift for consumers to consider a landfill alternative for their perceived end-of-life products.

It is anticipated that consumption patterns will evolve over time as Solano County makes additional programs available to turn discarded materials into recycled products.

Opportunities to reduce the waste stream and related emissions include the following zero-waste measures:

1) Expand organics collection to include food waste and soiled paper,

2) Develop a commercial recycling program,

3) Adopt a construction and demolition waste ordinance,

4) Increase landfill methane capture, and

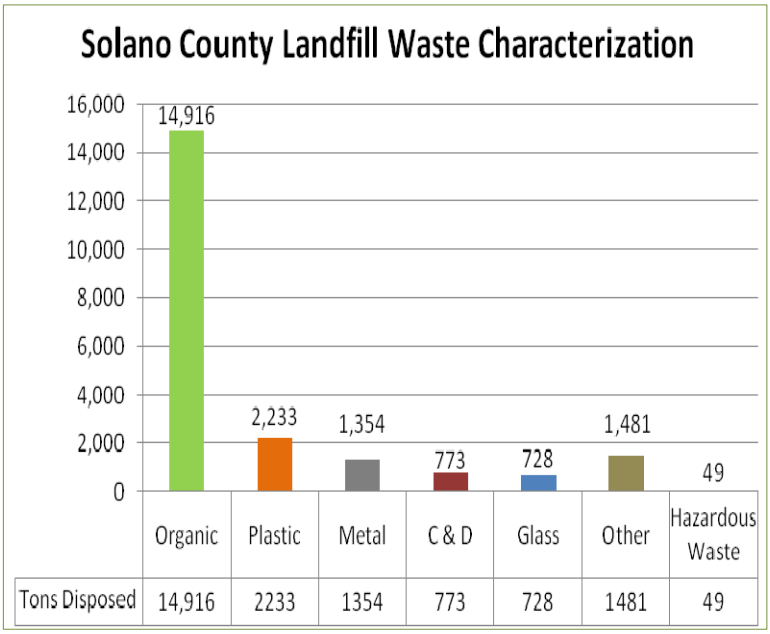
5) Establish a Zero-Waste Committee to promote a Sustainable Solano County by encouraging the application of zero-waste principles by the general citizenry through participation at public events.

The disposal of organic waste in landfills releases methane, a potent GHG. In Solano County, organic waste makes up about 70% of the unincorporated waste stream. The diversion of these additional organic components, commingled with yard waste, creates an effective emissions reduction strategy and will go a long way toward achieving waste reduction goals. Adopting the construction and demolition ordinance proposed in the Draft CAP will reduce building wastes by 60%. Optimizing landfill design and operation will increase methane capture control efficiency from 77% to 90%. Combined, these strategies will eliminate a substantial portion of the County's waste emissions in 2020. Solano County has a Local Task Force (LTF) for Integrated Waste Management which is comprised of 26 permanent members representing the County, cities, solid waste/recycling service providers, and local environmental groups. The LTF meets bi-monthly to coordinate countywide implementation of solid waste diversion programs to meet the goals,

**GHG Reduction Potential**

**15,180 MT $CO_2$/yr**

policies, and procedures of the state-mandated Countywide Integrated Waste Management Plan (CIWMP), several of which are described in Chapter 2.




The CIWMP is made-up of the following five elements: Non-Disposal Facility Element (NDFE), Siting Element (SE), Source Reduction and Recycling Element (SRRE), Household Hazardous Waste Element (HHWE), and Summary Plan (SP). The California Department of Resources, Recovery, and Recycling (CalRecycle) is the State's authority tasked to ensure every California jurisdiction complies with the Integrated Waste Management Act of 1989, or AB 939. In 2009, Solano County began a comprehensive update to the CIWMP beginning with a second amendment to the Countywide NDFE. This element identifies the facilities that manage and/or process recyclable commodities and organics that are diverted from landfills but generated within the borders of Solano County by both the residential and commercial sectors. Solano County is currently preparing the first amendment to the Siting Element that describes solid waste facilities, such as landfills. The sum of the available disposal capacity at these sites is required to provide Solano County and its cities with a minimum of 15 years solid waste disposal capacity. The Source Reduction and Recycling Element and Household Hazardous Waste Element both identify programs to be implemented in order to achieve AB 939 compliance.

Presently, most of Solano County's solid waste is reduced by diverting waste products from landfills through recycling strategies such as source reduction, reuse, and composting. Solano County has been implementing Senate Bill (SB) 1016, which was enacted in 2007 to make the process of AB 939 goal measurement more simple timely, and accurate. The CAP bases the 50% reduction goal on the 2006-2008 average disposal rates per person, as waste service participation has only been mandatory since 2005. Yard waste service is provided but organics is limited. However, an expansion of the yard waste program to include all organics will remove valuable biomass from garbage on the household level and would be an easy way to achieve reductions and reuse organic matter, if composted. Solano County is in a unique position to increase its diversion rate by composting most, if not all, of its organic-generated matter at one of the region's largest organic processors, Jepson Prairie Organics.
Table 3-4 highlights opportunities for waste diversion, recycling and composting services in unincorporated Solano County.

*"Waste is a symptom of an inefficient process. Preventing waste increases efficiency. Increasing efficiency increases profits. Theoretically speaking, it is better to prevent the generation of waste than it is to recycle. You can only recycle waste that you have failed to prevent. So, place your emphasis on reducing waste if you can, then recycle the waste that you must generate."*

*www.Calrecycle.ca.gov , 2010*

| Table 3-4: Waste Diversion, Recycling and Composting Opportunities | | |
|---|---|---|
| **Unincorporated County** | **Waste Pick up Service** | **Waste Diversion Opportunities** |
| **Outside of the City of Benicia** | Allied Waste Services (also known as Pleasant Hill Bayshore Disposal); (designated provider) | Extend bi-weekly residential yard waste curbside collection to include food waste and soiled-paper. |
| **Outside of the City of Vallejo** | Recology Vacaville Solano, formerly Vacaville Sanitary Service (Service agreement expires Dec. 31, 2014) | Expand collection to include food waste and soiled-paper to commingled grass clippings, leaves, tree/shrub prunings, weeds, bread, and kitchen fruit and vegetable scraps; expand organics collection to commercial sector (restaurants). |
| **Outside of the Cities of Fairfield and Suisun City** | Solano Garbage Company (Service agreement expires Dec. 31, 2014) | Expand plastic recycling to include more than just #1 & #2 plastics; expand curbside yard waste to include food waste and soiled-paper for residential and commercial sectors. |
| **Outside the Cities of Dixon and Vacaville** | Recology Vacaville Solano, formerly Vacaville Sanitary Service (Service agreement expires Dec. 31, 2014) | Provide weekly curbside pick-up for mixed organics for the residential and commercial sectors. |
| **Outside of Rio Vista** | Garaventa Enterprises, Inc./Rio Vista Sanitation Service (designated provider) | Provide weekly curbside pick-up for mixed organics compost for the residential and commercial sectors. |

Source Information: 2010 Integrated Waste Management Plan for the Countywide Non-Disposal Facility Element (NDFE)[i]

## ZERO-WASTE PLAN

**W-1: Work with the Local Task Force and other organizations to create a zero-waste plan and provide public education regarding zero-waste strategies and implementation.**

*Measure Description:*

A zero-waste plan describes the goals of zero waste, reducing garbage and increasing goods reuse and recycling, while creating jobs in the process. The State adopted "Zero-Waste California" in its strategic plan, sending a message to all Californians to change the way we think, talk and act regarding our waste disposal habits. There are several opportunities to further increase the diversion of waste in unincorporated Solano County by offering more recycling and composting options, as well as providing additional public outreach and training on how to avoid waste-creation. The Local Task Force for Integrated Waste Management has had success implementing innovative programs such as the Tire Amnesty Program (described in Chapter 2). Collaborating with other organizations such as Californians Against Waste will result in an ambitious zero-waste plan for Solano County. Several innovative communities in the U.S. and abroad have endorsed zero-waste goals and planning. Del Norte and San Jose are among the early adopters, and San Francisco has adopted zero-waste as a guiding principle for mandatory recycling and composting.

Protecting our resources and maximizing goods recycling and reuse is a priority. By ensuring that recycled products are designed to be environmentally-friendly, we can create materials for new markets while protecting human health and the environment.[ii] However, it is also important to consider programs that reduce overall waste generation, and to first consider reuse options. Personal choices regarding products, packaging, and consumption determine personal contributions to community waste streams. Lowering overall consumption and buying more climate-friendly, durable products with minimal packaging can reduce both waste generation and GHG emissions. The Zero-Waste Plan includes education and incentives to significantly reduce even the generation of materials that need to be recycled or disposed of. Providing the infrastructure, education and incentives to reduce, recycle and compost will encourage greater public participation; however mandatory measures may be explored in the future to achieve higher participation. The average amount of waste pounds per person per day (PPD) for the population in the unincorporated portion of the County is 4.95 PPD and 17.3 PPD for Businesses for the years 2006-2008. A 50% diversion by 2020 would result in rates of approximately 2.5 PPD for households and 8.7 PPD for businesses.

**GHG Reduction Potential (MT $CO_2e$/yr):**

***15,180***

**Community Benefits:**

**Cost to County**

*Medium*

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Develop a waste reduction outreach program to reduce solid waste diverted from landfills to 75% by the end of 2020. Expand recycling and composting programs in the residential, agricultural, commercial and industrial sectors. | Short Term (1-2 years) | Resource Management |
| **B** | Develop a multi-family recycling program for apartment and condominium complexes. | Short Term (1-2 years) | Resource Management |
| **C** | Provide incentives (e.g., awards programs) for increased participation in recycling and composting programs. Work with Solano County cities to offer composting classes as a means of increasing this participation. | Short Term (1-2 years) | Resource Management |
| **D** | Develop an organics policy that that requires all food scraps and food-soiled paper to be commingled with yard waste and composted. Coordinate with service providers to have organics composted and encourage agricultural communities to participate. | Medium Term (3-5 years) | Resource Management |
| **Performance Indicator** | | Target | |
| **i** | Household waste disposal rate | 2.5 PPD by 2020 | |
| **ii** | Business waste disposal rate | 8.7 PPD by 2020 | |
| **Related General Plan Policies and Implementation Programs** | | | |
| **PF.I-29:** Expand waste minimization efforts, including household recycling, food waste and green waste recycling, business paper recycling, and construction and demolition recycling. Require commercial and industrial recycling. Require building projects to recycle or reuse a minimum of 50 percent of unused or leftover building materials.<br>**PF.P-27:** Require responsible waste management practices, including recycling and composting. Coordinate with service providers to compost green waste and encourage local farmers to use this.<br>**PF.P-28:** Promote technologies that allow the use and reuse of solid waste, including biomass or biofuel as an alternative energy source. | | | |

## Construction and Demolition Ordinance

**W-2: Adopt a Construction and Demolition Ordinance to require 65% of construction and demolition debris to be recycled or reused by 2020.**

*Measure Description:*

Construction and demolition (C&D) materials account for almost 22 percent of the waste stream in California. Reusing and recycling these materials conserves natural resources and energy while saving money and creating new resource streams and jobs. Solano County provides C&D diversion options in the unincorporated areas of the County, but does not have a C&D ordinance in place. (Only the cities of Fairfield and Vallejo have implemented C&D ordinances to date.) CalRecycle provides a list of best practices and other resources, such as a Model Ordinance and toolkit for local governments.

The Solano County General Plan currently requires and, in 2011, the California Green Building Code will require 50% diversion of C&D materials for all new residential and commercial projects, with few exceptions. Jurisdictions have found that providing a phase-in period prior to implementing a construction and demolition (C&D) diversion ordinance allows time to train staff and to inform contractors about the ordinance and its requirements. Following this approach can ensure smoother implementation and compliance with the Code.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Extend C&D waste diversion outreach programs to contractors and building professionals. | Short Term (1-2 years) | Resource Management |
| **B** | Target waste generators, conduct waste audits, provide training and other assistance, and collaborate with associations, producers, processors, service providers, unions and others to increase C&D waste diversion. | Short Term (1-2 years) | Resource Management |
| **C** | Require that demolition projects submit a plan to maximize reuse of building materials at the time of permit application. | Short Term (1-2 years) | Resource Management |
| **Performance Indicator** | | Target | |
| **i** | C&D diversion rate | 65% by 2020 | |

**Related General Plan Policies and Implementation Programs**

**PF.I-28:** Require that demolition projects submit a plan to maximize reuse of building materials at the time of permit application.
**PF.I-29**: Expand waste minimization efforts, including [...] construction and demolition recycling. Require commercial and industrial recycling. Require building projects to recycle or reuse a minimum of 50 percent of unused or leftover building materials.

**GHG Reduction Potential ($MT CO_2e/yr$):**

*Supporting Measure*

**Community Benefits:**

**Cost to County**

*Low*

## COMMERCIAL RECYCLING PROGRAM

**W-3: Work with State agencies to provide free audits to commercial generators and recommend strategies to reduce waste and increase recycling and composting.**

*Measure Description:*

To support the zero -waste plan, in collaboration with State agencies and the local waste management services, Solano County and its solid waste providers will provide free waste audits and prepare waste reduction strategies, with a focus on commercial waste generators. These planning tools are intended to facilitate the discussions necessary to develop large-scale reuse and recycling of solid waste, such as renewable energy generation and combined heat and power uses in the eco-industrial park recommended within this CAP.

**GHG Reduction Potential (MT $CO_2e$/yr):**

*Supporting Measure*

**Community Benefits:**

**Cost to County**

*Very Low*

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Work with solid waste providers and state guidance from CalRecycle, to provide free waste audits to commercial waste generators. | Short Term (1-2 years) | Resource Management |
| **B** | Develop strategies to reduce commercial waste disposal and increase recycling and composting. | Medium Term (3-5 years) | Resource Management |
| **C** | Review the potential for large generators to contribute to or locate within in an eco-industrial park that incorporates industrial ecology, renewable energy generation and zero-waste practices. [See E-7] | Medium Term (3-5 years) | Resource Management |
| **Performance Indicator** | | Target | |
| **i** | Participation rate in free waste audits by major waste generators. | 50% by 2020 | |
| **Related General Plan Policies and Implementation Programs** | | | |
| **PF.P-27:** Require responsible waste management practices, including recycling and composting. Coordinate with service providers to compost green waste and encourage local farmers to use this.<br>**PF.P-28:** Promote technologies that allow the use and reuse of solid waste, including biomass or biofuel as an alternative energy source. | | | |

## METHANE CAPTURE

**W-4: Facilitate CalRecycle and the State Air Resources Board's (ARB) implementation of the Landfill Methane Capture Strategy by requiring landfills to capture methane to the greatest extent feasible.**

*Measure Description:*

CalRecycle has identified a Climate Action Team (CAT) strategy for increasing landfill methane capture and reducing methane emissions by 2020. The Landfill Methane Capture Strategy includes three core components[iii]:

- Install new methane control systems at landfills currently lacking them.
- Maximize landfill methane capture efficiencies by optimizing landfill design, operation, and closure/post-closure practices.
- Increase recovery of landfill gas for use as a biomass renewable energy source to replace energy from nonrenewable fossil fuel sources.

As of March 2010, ARB staff developed a Landfill Gas (LFG) Tool to assist owners and operators in complying with the Early Action Landfill Regulation. It is based on the mathematically exact first-order decay model from the 2006 Intergovernmental Panel on Climate Change (IPCC) guidelines and is designed to estimate the fugitive emissions from a landfill that does not have a landfill gas collection system. It has been expanded by ARB staff to include an estimate of the landfill's captured gas heating value (in MM Btu/hr). The same data sources and methods are referenced in the ARB Local Government Operations Protocol (LGOP) for the quantification of GHG emissions from landfills[iv]. Solano County will work with State agencies and owners and operators of methane-producing facilities to implement the early action landfill regulation, which will become effective on January 1, 2011.[v] For example, Recology, Inc., which manages the Hay Road Landfill, has just expanded their LFG control system and installed an enclosed flare in order to reduce methane emissions from the site. This voluntary project is eligible to generate GHG emission reduction credits through the Climate Action Registry's landfill gas project protocol. The site is one of five landfills in California listed on CAR's website and is on track to become the first landfill gas emissions reductions project to be verified in California under the CAR protocol.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Work with State agencies and the owners and operators of methane-producing facilities (e.g., landfills, wastewater treatment plants) to establish methane recovery and electricity generation systems. | Medium Term (3-5 years) | Resource Management |
| **Related General Plan Policies and Implementation Programs** | | | |
| **PF.I-5:** Work with the owners and operators of methane-producing facilities (e.g., landfills, wastewater treatment plants) to establish methane recovery and electric generation systems. | | | |

**GHG Reduction Potential (MT $CO_2e$/yr):**

*Supporting Measure*

**Community Benefits:**

**Cost to County**

*Low*

[ii] http://www.calrecycle.ca.gov/Archive/IWMBAR/2004/default.htm#Building

[iii] http://www.calrecycle.ca.gov/climate/Landfills/default.htm

[iv] http://www.arb.ca.gov/cc/landfills/landfills.htm

[v] http://www.arb.ca.gov/cc/landfills/docs/statusupdate1.pdf

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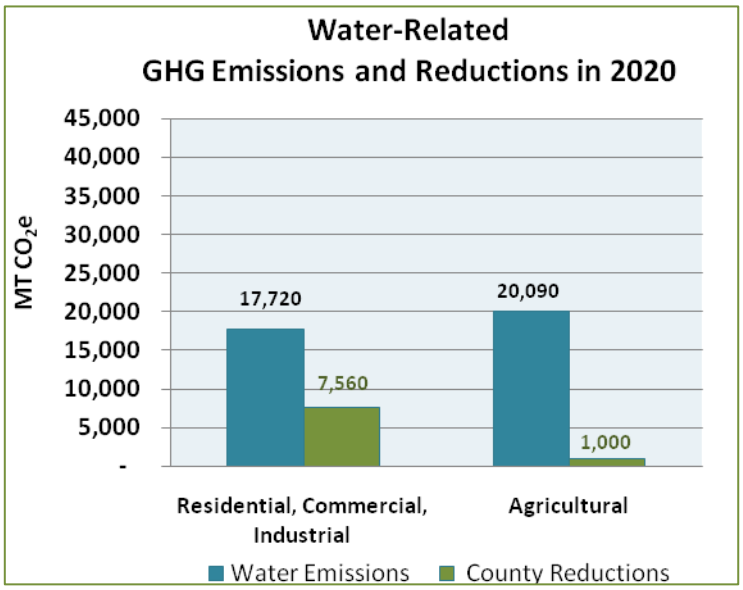
# Water Conservation

## OBJECTIVE: PROMOTE EFFICIENT MANAGEMENT AND USE OF WATER.

Water-related GHG emissions are mainly caused by energy used to pump, transport, store, treat and distribute water; and to collect, treat and discharge wastewater. According to the California Energy Commission, these activities consume about 19 percent of the State's electricity, 30 percent of its natural gas, and 88 billion gallons of diesel fuel every year.[i] Thus, reducing water use and improving efficiency can help reduce both energy use and GHG emissions. About 2.8% of Solano County's communitywide GHG emissions are related to water use. This figure does not consider all water users, since emissions from diesel pumps, used by many residents to pump their own well water in the unincorporated area of the County, have not been quantified.




Solano County residents are currently not subject to water cutbacks or mandatory water use restrictions like many other Californians since Lake Berryessa, the primary water source for many Solano County cities and agriculture is over 80% full. This translates to about 1.3 million acre-feet (one acre-foot is equal to approximately 326,000 gallons)[ii]. Nevertheless, the Solano County Water Agency (SCWA), the wholesaler for urban and agricultural water in Solano County and its member cities and districts, recognizes that water is a limited and precious natural resource. Therefore, the added dimension of water-related GHG emissions requires water districts and the County to examine the energy expended on water treatment and distribution, and to provide further incentives to conserve water. The County will work with the SCWA to identify community actions that can reduce potable water demand and increase agricultural water efficiencies.

SCWA has a reliable water supply, delivering untreated water from the federal Solano Project to urban and agricultural users. The agency also receives as much as 20 percent of its supply from the North Bay Aqueduct of the State Water Project (SWP). The SWP is over-committed, however, and is not able to meet its allocations to SWP contractors, including SCWA, in dry and even some normal years. Member agencies divert other water supplies from the Bay-Delta estuary. The region also has substantial groundwater resources, which supply some Solano County cities and agricultural districts, but this water resource remains largely unquantified. The cities of Rio Vista and Dixon rely solely upon groundwater, while approximately one-third of Vacaville's municipal water supply is from

**GHG Reduction Potential**

**8,560 MT $CO_2$/yr**

groundwater. Most growers within the Solano Irrigation District (SID) use surface water from the Solano Project, but also use wells to supplement their surface water supply.

Maine Prairie Water District (MPWD) and Reclamation District 2068 provide surface water to their growers, and do not currently use groundwater.

*Summary Of Regional Supplies*

| Type of Supply | Amount of Supply (in acre-feet per year) |
|---|---|
| Solano Project | 192,350 |
| SWP | 47,206 |
| VPW | 17,287 |
| Settlement Water | 31,620 |
| Groundwater | 23,300 |
| Local | 900 |
| ***Total*** | ***312,663*** |

Source: IRWMP 2005

Growers outside the water districts' service areas rely entirely on groundwater unless they have individual rights to a surface water supply. Most rural residential landowners have their own shallow groundwater wells that serve their domestic needs. Some small rural residential water systems also distribute groundwater to their customers.

Preparing for climate change is a key issue identified in the 2005 Integrated Regional Water Management Plan (IRWMP). As a result of rising global temperatures, drier and hotter summers along with decreased snow pack are forecast; and sea level rise is expected to adversely affect groundwater by increasing its salinity through seawater infiltration, particularly in the southern part of the County. In conjunction with a growing water demand, these climatic factors place additional strain on water supplies, emphasizing the need to develop effective strategies that will increase water use efficiency.

## AGRICULTURAL WATER MANAGEMENT

**WC-1: Work with the Agricultural Water Conservation Committee of the Solano Water Advisory Commission to promote efficient irrigation and agricultural water management.**

*Measure Description:*

The Agriculture Water Conservation Committee of the Solano Water Advisory Commission has assisted growers in Solano County with water use and efficiency efforts since 1992. The Committee is made up of representatives from Solano County Water Agency, Solano Irrigation District, U.C. Cooperative Extension, Reclamation District 2068, Maine Prairie Water District, Ulatis Resource Conservation District, Dixon Resource Conservation District, and Natural Resources Conservation District, Dixon Office.[iii]

Solano County will work with the Agricultural Water Conservation Committee to develop and promote efficient irrigation strategies that will enhance agricultural water management and, at the same time, produce fewer water-related GHG emissions. The goal is to reduce agricultural water use by 5% by 2020.

The County may be able to assist farmers in overcoming some of the financial, legal, and institutional barriers that restrict crop choices, and investment in cost-effective technologies and management practices, as outlined in a 2008 study by the Pacific Institute, "More with Less: Agricultural Water Conservation and Efficiency in California".[iv] Encouraging the use of greywater and rainwater collection programs and installing weather-based irrigation systems, as well as requiring irrigation designers and installers to be trained in water efficiency, are other ways that the County can assist with agricultural water management.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Improve access to water-efficiency information and education, evaluation programs, on-site technical assistance and other agricultural outreach efforts. | Short Term (1-2 years) | Agriculture Department |
| **B** | Facilitate grower participation in greywater and rainwater collection programs. | Medium Term (3-5 years) | Agriculture Department |
| **C** | Require water efficiency training for irrigation designers and installers. This includes working with local water suppliers to distribute information about water conservation and incentives for more efficient water use. | Short Term (1-2 years) | Agriculture Department , Resource Management |
| **D** | Encourage the installation of weather-based evapotranspiration controller irrigation systems in private landscapes. | Short Term (1-2 years) | Resource Management |
| **E** | Include agricultural water use in the County's next GHG inventory. | Medium Term (3-5 years) | Resource Management |

**GHG Reduction Potential (MT $CO_2e$/yr):**

***1,000***

**Community Benefits:**

**Cost to County**

*Very Low*

| Performance Indicator | | Target |
|---|---|---|
| i | Reduce agricultural water use. | 5% by 2020 |

**Related General Plan Policies and Implementation Programs**

**AG.P-9:** Promote efficient management and use of agricultural water resources.
**AG.P-10:** Support efforts by irrigation districts and others to expand the county's irrigated agricultural areas where appropriate.
**PF.P-13:** Support efforts by irrigation districts and others to expand Solano County's irrigated agricultural areas.
**PF.P-14:** In areas identified with marginal water supplies, require appropriate evidence of adequate water supply and recharge to support proposed development and water recharge.
**PF.P-10:** Maintain an adequate water supply by promoting water conservation and development of additional cost-effective water sources that do not result in environmental damage.
**PF.P-11:** Promote and model practices to improve the efficiency of water use, including the use of water-efficient landscaping, beneficial reuse of treated wastewater, rainwater harvesting, and water-conserving appliances and plumbing fixtures.
**PF.I-16:** Encourage water agencies to require water efficiency training and certification for landscape irrigation designers and installers, and property managers. Work with local partners and water suppliers to educate the public about water conservation options, including landscaping, irrigation, low-water appliances, and other measures the public can take to reduce water use. Encourage water suppliers to provide incentives for customers that use water more efficiently.
**PF.I-18:** Encourage and assist water suppliers in providing incentives to encourage water conservation or reuse.

## WATER CONSERVATION OUTREACH AND INCENTIVES

**WC-2: Work with Solano County water providers, including representatives for well users that share water with their neighbors for residential water use, to expand and promote outreach programs and incentives for water conservation.**

*Measure Description:*

Solano County Water Agency (SCWA), an EPA Water Sense Program Partner, has taken several steps to promote water conservation in Solano County. SCWA provides information on free water-saving audits, water-saving devices and incentive programs for residential, commercial, industrial and institutional water users. Water conservation programs include rebates for high-efficiency toilets, Solano Smart irrigation controllers (currently running through June 2011)[v], turf grass replacement with drip-irrigated low water-use plants, and permeable hardscape/artificial turf products. All County residences and businesses can request free water use surveys to identify conservation and savings opportunities.

To further improve water conservation efforts and encourage property owners to increase indoor and outdoor water efficiency by 20% or more by 2020, the County will work with SCWA to expand existing outreach programs and enact measures that support the use of greywater and encourage the installation of efficient plumbing fixtures in remodels and renovations. The effort to conserve water by facilitating greater reuse of greywater in California has become possible since the Department of Housing and Community Development amended the 2007 Plumbing Code in July 2009[vi]. Greywater and rainwater use will help achieve the County's water-efficiency goal, especially in rural areas.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Increase education and outreach efforts in water-use reduction, water-efficiency and water conservation for residential, commercial, industrial and institutional water users. | Short Term (1-2 years) | Resource Management |
| **B** | Adopt a Greywater Ordinance to require installation of greywater systems in new residential and commercial construction projects. Allow for and promote greywater use and rainwater collection in existing residential and commercial areas. | Medium Term (3-5 years) | Resource Management |
| **C** | Require residential and commercial remodels and renovations to improve plumbing fixtures and fixture-fitting water efficiency by 20% above the California Building Standards Code water-efficiency standards. Work with SCWA to continue incentive programs for fixtures and appliances. | Short Term (1-2 years) | Resource Management |
| **Performance Indicator** | | Target | |
| **i** | Combined reduction in residential, commercial, industrial and institutional (non-agricultural) water consumption. | 20% by 2020 | |

**GHG Reduction Potential (MT $CO_2e$/yr):**

***7,560***

**Community Benefits:**

**Cost to County**

*Very Low*

**Related General Plan Policies and Implementation Programs**

**PF.P-10:** Maintain an adequate water supply by promoting water conservation and development of additional cost-effective water sources that do not result in environmental damage.
**PF.P-11:** Promote and model practices to improve the efficiency of water use, including the use of water-efficient landscaping, beneficial reuse of treated wastewater, rainwater harvesting, and water-conserving appliances and plumbing fixtures.
**PF.I-16:** Encourage water agencies to require water efficiency training and certification for landscape irrigation designers and installers, and property managers. Work with local partners and water suppliers to educate the public about water conservation options, including landscaping, irrigation, low-water appliances, and other measures the public can take to reduce water use. Encourage water suppliers to provide incentives for customers that use water more efficiently.
**PF.I-18:** Encourage and assist water suppliers in providing incentives to encourage water conservation or reuse.

## WATER EFFICIENCY IN MAJOR LANDSCAPE PROJECTS

**WC-3: Increase water-efficiency requirements for major (>2,500 square feet) landscape projects in new construction and remodels.**

*Measure Description:*

Resource efficient landscaping applies numerous principles and practices that reduce the nutrient, water and energy inputs and outputs resulting from residential landscapes. The two core goals of resource efficient landscaping and irrigation are nutrient sources control and efficient irrigation application.

Additional principles that can help reduce the water quality and supply effects from landscapes are preservation or planting of tree canopy, reducing use of high-maintenance turfgrass, using appropriately sited native plants, and using reclaimed water for irrigation. All of these concepts support the "reduce, reuse, recycle" philosophy. Technologies such as soil moisture sensors and micro-irrigation can help reduce overwatering, while greywater reuse systems can replace potable water use.[vii]

Solano County will adopt ordinances which focus on water-efficient landscaping and will encourage property owners to use climate-appropriate plants, efficient irrigation systems, and rainwater capture and greywater, as applicable. The County's goal is for non-agricultural property owners to reduce their use of potable water for irrigation by 50% by 2020, consistent with the 2008 California Green Building Standards[viii]. In addition, the County will establish ordinances requiring the use of water-conserving appliances and plumbing fixtures in accordance with the 2010 California Green Building Standards, scheduled to become effective in 2011.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Adopt a water-efficient landscape ordinance that requires new landscape projects (> 2,500 square feet) to reduce potable water consumption by 50% against baseline as defined in Green Building Standards beyond the initial requirements for plant installation and establishment. | Short Term (1-2 years) | Resource Management |
| **B** | Adopt ordinances that require the use of water-efficient landscaping, water-conserving appliances and plumbing fixtures. | Medium Term (3-5 years) | Resource Management |
| **Performance Indicator** | | Target | |
| **i** | Reduce the use of potable water for landscape irrigation purposes on non-agricultural property. | 50% by 2020 | |
| **Related General Plan Policies and Programs** | | | |
| **PF.P-20:** Minimize the consumption of water in all new development.<br>**PF.I-9:** Adopt ordinances that require the use of water-efficient landscaping, water-conserving appliances and plumbing fixtures. | | | |

**GHG Reduction Potential (MT $CO_2e$/yr):**

*Supporting Measure*

**Community Benefits:**

**Cost to County**

*Very Low*

## WATER CONSERVATION IN COUNTY OPERATIONS

**WC-M1: Reduce water use in County buildings and landscape irrigation.**

*Measure Description:*

Solano County is committed to serving as an example to the community through efficient water use. The County has taken actions to reduce water consumption in County buildings and operations, the most recent example being the LEED-Bronze certified County Administrative Building in Fairfield, which showcases this commitment using innovative water conservation fixtures both inside and outside the building. To accurately update water usage and conservation practices in other facilities and operations, the County will conduct a water use audit. Based on the audit findings, the County can update fixtures, appliances, and operations to improve water use efficiency and use greywater wherever feasible.

| Action | | Timetable | Responsibility |
|---|---|---|---|
| **A** | Audit water use and conservation practices in County-operated facilities. | Short Term (1-2 years) | General Services |
| **B** | Based on the findings of the audit, develop and implement water conservation programs as defined by state law and enact new measures using emerging technology. | Medium Term (3-5 years) | General Services |
| **Performance Indicator** | | Target | |
| **i** | Reduce water use in County buildings with old or inefficient systems built prior to 1994. | 20% by 2020 | |
| **ii** | Reduce landscape irrigation on County properties. | 20% by 2020 | |
| **Related General Plan Policies and Implementation Programs** | | | |
| **PF.I-17:** Assess water use in County-operated facilities and implement programs for efficient water use and wastewater reuse. Implement water conservation programs as defined by state law and develop new measures in response to community input and changing technology. | | | |

**GHG Reduction Potential (MT $CO_2e$/yr):**

*Supporting Measure*

**Community Benefits:**

**Cost to County**

*Very Low*

*Photo by Michael O'Callahan*

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# 4 BENCHMARKS AND NEXT STEPS

Solano County recognizes that climate change is a critical challenge. The Climate Action Plan (CAP) provides vision and guidance for climate protection efforts in the unincorporated county. To achieve greenhouse gas (GHG) emission reduction targets, this vision must be translated into on-the-ground change. This chapter describes how Solano County will implement the recommended CAP measures. The chapter contains the following three sections:

- **Measure Implementation and Benchmarks**: Describes how County staff will implement CAP measures and related actions and the role of progress indicators and timetables.
- **Plan Evaluation and Evolution**: Discusses the need to evaluate, update, and amend the CAP over time, to ensure that the plan remains effective and current.
- **Funding Sources and Financing**: Describes funding sources and financing available to implement CAP measures and actions.

## Measure Implementation and Benchmarks

Ensuring that the recommended measures translate to on-the-ground results is critical to the success of the CAP. To facilitate this, each measure described in Chapter 3 contains a table that identifies specific actions the County will carry out. The table also identifies responsible departments and establishes an implementation schedule for each action.

The second section of each table provides progress indicators and performance targets that enable staff, the Board of Supervisors, and the public to track measure implementation and monitor overall progress. These tables provide interim progress indicators where applicable. These indicators form suitable benchmarks to monitor implementation progress. Table 4-1 lists each recommended CAP measure with a quantified reduction, identifies the applicable performance standard, shows whether the measure is mandatory or voluntary, and if the measure applies to new or existing development, or both.

## Plan Evaluation and Evolution

The CAP lays out a comprehensive, communitywide strategy to reduce GHGs and improve sustainability. County staff will evaluate the CAP's performance over time and be prepared to alter or amend the plan if it is not achieving the reduction target.

### Plan Evaluation

Two types of performance evaluation are important: evaluation of the CAP as a whole and evaluation of the individual measures. Subsequent GHG emission inventories will provide the best indication of CAP effectiveness, and provide a way to reconcile actual growth with the growth projected by the General Plan and CAP. Conducting periodic inventories allows comparison with the 2005 baseline and demonstrates ability to achieve the reduction target.

| Table 4-1: Summary of Climate Action Plan Performance Standards | | | | | |
|---|---|---|---|---|---|
| **Measure Number and Title** | **GHG Emission Reductions (MT $CO_2e$/yr)** | **Performance Metric** | | **Applicability** | **Mandatory or Voluntary** |
| | | Standard | Target | | |
| AG-1: Soil Management | 3,960 | Acres of corn, alfalfa, and wheat with 25% reduction in mineral fertilizer application from baseline (2005). | 66,277 by 2020 | Agriculture | Voluntary |
| | | Acres of crops (other than corn, alfalfa, or wheat) with 10% reduction in mineral fertilizer application from baseline (2005). | 51,058 by 2020 | Agriculture | Voluntary |
| AG-2: Field Equipment Fuel Efficiency | 3,790 | Efficiency improvement in field equipment energy use (assumes 35% participation) | 15% by 2020 | Agriculture | Voluntary |
| AG-4: High GWP Pesticide Ban | 2,760 | Pounds of sulfuryl fluoride used in the unincorporated county | 8,240 by 2020 | Agriculture | Voluntary |
| | | Pounds of methyl bromide used in the unincorporated county | 0 by 2020 | | |
| | | | | | |
| E-1: Tiered Consumer Choice Aggregation (CCA) | 23,170 | Unincorporated county consumers participating in 65% renewable CCA | 50% by 2020 | New and Existing Development | Voluntary |
| | | Unincorporated county residents participating in 100% renewable CCA | 30% by 2020 | | |
| E-2: Renewable Energy Outreach | 4,080 | Percentage of building owners that have installed a renewable energy system | 5% Solar PV by 2020<br>30% Solar Hot Water by 2020 | Existing Development | Voluntary |
| E-3: Energy Efficiency Program | 1,660 | Percentage of building owners that have performed an energy efficiency retrofit achieving 20% improvement from 2005 efficiency | 40% of Residential by 2020<br>50% of Low-Income by 2020 | Existing Development | Voluntary |
| E-4: New Construction Energy Efficiency | 270 | New residential and commercial buildings exceeding Title 24 energy performance by 15% | 100% by 2020 | New Development | Mandatory |

**Table 4-1:**
**Summary of Climate Action Plan Performance Standards**

| Measure Number and Title | GHG Emission Reductions (MT $CO_2e$/yr) | Performance Metric | | Applicability | Mandatory or Voluntary |
|---|---|---|---|---|---|
| | | Standard | Target | | |
| E-5: Food-Waste to Energy Biomass Facility | 380 | Develop Biomass Facility for a minimum of 3,518 short tons of agricultural by-products/residue and /or municipal solid waste a year. | 20% plant efficiency heat-to- electricity by 2020. | County Facilities | Voluntary |
| E-6: Industrial and Agricultural Energy Efficiency | 730 | Percentage of industrial and agricultural processing facilities that increase energy efficiency by 15% | 5% by 2020 | New and Existing Development | Mandatory for New; Voluntary for Existing |
| E-M1: County Energy Efficiency | 1,040 | Percentage of total energy consumption reduction in County facilities | 20% by 2020 | County Facilities | Mandatory |
| E-M2: County Renewable Sources | 1,130 | Locally-generated renewable energy used for County operations | 50% by 2020 | County Facilities | Mandatory |
| | | | | | |
| TC-1: Ride-Share Infrastructure | 7,940 | Increase in carpool mode share. | 5% by 2020 | New and Existing Development | Voluntary; Mandatory for large employers |
| | | Number of employers participating by creating ride share databases and/or allowing flexible work schedules and telecommuting. | 20% by 2020 | | |
| TC-2: Public Transit Mode Shift | 1,000 | Increase in transit mode (i.e., bus, rail, ferry) | 1% by 2020 | New and Existing Development | Voluntary |
| TC-3: Pedestrian and Bicycle Mode Shift | 500 | Increase in pedestrian and bicycle mode share and resulting decrease in single occupancy vehicle mode share | 0.5% by 2020 | New and Existing Development | Mandatory for New; Voluntary for Existing |
| TC-M1: County Vehicle Fleet Fuel Efficiency | 300 | Percent of County fleet vehicles that are 25% more fuel efficient than current vehicles | 50% by 2020 | County Facilities | Mandatory |
| | | Traditional County fleet vehicles replaced with alternative fuel vehicles | 20% by 2020 | | |
| | | | | | |

| Table 4-1: Summary of Climate Action Plan Performance Standards | | | | | |
|---|---|---|---|---|---|
| **Measure Number and Title** | **GHG Emission Reductions (MT $CO_2e$/yr)** | **Performance Metric** | | **Applicability** | **Mandatory or Voluntary** |
| | | Standard | Target | | |
| W-1: Solid Waste Diversion | 15,180 | Household waste diversion rate | 2.5 PPD by 2020 | New and Existing Development | Voluntary; Mandatory food waste program |
| | | Business waste diversion rate | 8.7 PPD by 2020 | | |
| | | | | | |
| WC-1: Agricultural Water Conservation | 1,000 | Reduce agricultural water use | 5% by 2020 | Agriculture | Voluntary |
| WC-2: Water Conservation | 7,560 | Combined reduction in residential, commercial, industrial and institutional (non-agricultural) water consumption | 20% by 2020 | New and Existing Development | Mandatory |
| | | | | | |
| ***SUBTOTAL Reductions from CAP Measures*** | *76,440* | | | | |
| Assembly Bill 1493: Vehicle Emission Standards | 98,280 | | | | |
| Low Carbon Fuel Standard | 32,160 | | | | |
| ***SUBTOTAL Reductions from Statewide Legislation*** | *130,440* | | | | |
| **Total Reductions** | **206,880** | | | | |

The Department of Resource Management will coordinate communitywide inventories every three years beginning in 2012 to gauge the County's performance and progress in achieving the CAP target.

While inventories will provide information about overall GHG reductions, it is also important to understand the effectiveness of the individual measures. Evaluating the emission reduction capacity, cost, and benefit of individual measures improves implementation of the CAP. Through such evaluation, the County can more vigorously promote successful measures and reevaluate or replace under-performing measures. Evaluating measure performance requires both data regarding community participation and measurement of GHG reduction capacity.

The Department of Resource Management will coordinate evaluation of measures on an annual basis, and summarize progress toward meeting the GHG reduction target in an annual report to the Board of Supervisors that describes:

- Estimated annual GHG reductions (compared to 2005 and/or subsequent inventory years)
- Achievement of progress indicators
- Participation rates (where applicable)
- Implementation costs
- Community co-benefits realized
- Remaining barriers to implementation

### Plan Evolution

The County will amend the General Plan to incorporate this CAP and its measures and actions by reference. To remain relevant, the CAP must adapt and evolve over time as new information on climate change science and risk emerges, new GHG reduction technologies and innovative strategies are developed, new financing options are created, and state and federal legislation advances.

It is also possible that subsequent inventories will indicate that Solano County is not achieving its unincorporated area reduction target. As part of the evaluations identified above, the County will assess the implications of new findings in the field of climate change, explore new opportunities for GHG reduction and climate adaptation, respond to changes in climate policy, and incorporate relevant changes to ensure an effective and efficient CAP.

The CAP favors voluntary or incentive-based approaches to reducing GHG emissions, as opposed to regulatory mandates. The intent of these approaches is to promote high levels of community participation and, working with stakeholders and utilities, to provide adequate incentives to achieve the levels of emission reduction outlined in Tables 4-1 and 4-2. If, after at least two annual monitoring reports and at least one triennial inventory revision, the County determines that the CAP is not on track to achieve the reduction target, a review of available implementation strategies shall be considered including voluntary and mandatory measures that can be supported by available implementation strategies (e.g., funding, staff resources, technical assistance).

## Alternative GHG Reduction Scenarios

This CAP presents a full range of reduction strategies that, together, have potential to reduce countywide GHG emissions by more than 20% by 2020. However, the County recognizes that funding sources are currently limited, and has identified alternative implementation pathways with lower costs and/or delayed implementation that would also enable target achievement. Table 4-2 identifies measures proposed within the CAP and two alternatives: a *Cost Constrained Alternative* and a *Reduced Implementation Alternative*.

### Proposed CAP

The proposed CAP includes all measures described in Chapter 3. Implementation of proposed CAP measures and statewide reductions would enable the County to achieve GHG emission reductions of 26% below the 2005 baseline.

### Cost Constrained Alternative

The *Cost Constrained Alternative* describes a scenario in which the County only implements low cost measures. Implementation of this alternative group of measures and statewide reductions would enable the County to achieve GHG emission reductions of 21% below the 2005 baseline.

### Reduced Implementation Alternative

The Reduced Implementation Alternative describes a scenario in which the County implements measures and actions later and to a lesser degree by 2020 then proposed in the CAP. Implementation of this alternative group of measures and statewide reductions would enable the County to achieve GHG emission reductions of 25% (23% without the CCA) below the 2005 baseline.

**Table 4-2 Alternative GHG Reduction Scenarios Summary**

| Measure | Measure Description | Cost to Solano County | Proposed CAP GHG Reduction (MT CO2e/yr) | | Cost Constrained Alternative GHG Reduction (MT CO2e/yr) | Reduced Implementation Alternative GHG Reduction (MT CO2e/yr) | |
|---|---|---|---|---|---|---|---|
| AG-1 | Soil Management and Carbon Sequestration | Medium | 3,960 | | - | 1,120 | |
| AG-2 | Field Eqipment Outreach Program | Medium | 3,790 | | - | 950 | |
| AG-3 | Methane Emission Control | Low | Supporting Measure | | Supporting Measure | Supporting Measure | |
| AG-4 | Fumigant Alternatives | Low | 2,760 | | 2,760 | 2,760 | |
| AG-5 | Local Markets | Very low; Low | Supporting Measure | | Supporting Measure | Supporting Measure | |
| AG-6 | Agricultural Ombudsman | Medium | Supporting Measure | | Supporting Measure | Supporting Measure | |
| Total GHG Reduction AG Measures | | | 10,510 | | 2,760 | 4,830 | |
| | | | Tiered CCA | No CCA | No CCA | Tiered CCA | No CCA |
| E-1 | Community Choice Aggregation | High (Initial Cost) | 23,170 | | - | 23,170 | |
| E-2 | Comprehensive Renewable Energy Program | Medium | 4,080 | 5,630 | - | 2,870 | 4,260 |
| E-3 | Energy Efficiency Program | Low-Medium | 1,660 | 2,180 | 2,180 | 1,660 | 2,180 |
| E-4 | Green Building and Energy Efficiency | Low | 270 | 320 | 320 | 270 | 320 |
| E-5 | Food Waste to Energy Biodigester | Low-Medium | 380 | 380 | 380 | 380 | 380 |
| E-6 | Industrial and Process Energy Efficiency | Low-Medium | 730 | 740 | 740 | 730 | 740 |
| E-7 | Eco-Agriculture and Food Processing Park | Medium | Supporting Measure | | Supporting Measure | Supporting Measure | |
| E-M1 | Energy Efficiency in County Operations | Medium | 1,040 | 1,330 | - | 520 | 670 |
| E-M2 | Renewable Energy in County Operations | Medium | 1,130 | 1,710 | - | 250 | 380 |
| Total GHG Reduction Energy Measures | | | 32,460 | 12,290 | 3,620 | 29,850 | 8,930 |
| TC-1 | Rideshare Infrastructure | Low | 7,940 | | 7,940 | 7,940 | |
| TC-2 | Public Transit | Low | 1,000 | | 1,000 | 1,000 | |
| TC-3 | Bicycle and Pedestrian Connections | Low | 500 | | 500 | 500 | |
| TC-4 | Fuel Efficiency Public Outreach | Medium | Supporting Measure | | - | Supporting Measure | |
| TC-M1 | County Fleet Modernization | Medium | 300 | | - | 120 | |
| Total GHG Reduction Transportation Measures | | | 9,740 | | 9,440 | 9,560 | |
| LU-1 | Live-Work Uses | Very Low | Supporting Measure | | Supporting Measure | Supporting Measure | |
| LU-2 | Land Conservation | Very Low | Supporting Measure | | Supporting Measure | Supporting Measure | |
| LU-3 | Tree Planting | Low- Medium | Supporting Measure | | Supporting Measure | Supporting Measure | |
| Total GHG Reduction Land Use Measures | | | | | | | |
| W-1 | Zero-Waste Plan (75%) | Medium | 15,180 | | - | 15,180 | |
| W-2 | Construction and Demolition Ordinance | Low | Supporting Measure | | Supporting Measure | Supporting Measure | |
| W-3 | Commercial Recycling | Very Low | Supporting Measure | | Supporting Measure | Supporting Measure | |
| W-4 | Methane Capture | Low | Supporting Measure | | Supporting Measure | Supporting Measure | |
| Total GHG Reduction Waste Measures | | | 15,180 | | | 15,180 | |
| WC-1 | Agricultural Water Management | Very Low | 1,000 | | 1,000 | 1,000 | |
| WC-2 | Water Conservation Outreach and Incentives | Very Low | 7,560 | | 7,560 | 7,560 | |
| WC-3 | Water Efficiency in Major Landscape Projects | Very Low | Supporting Measure | | Supporting Measure | Supporting Measure | |
| WC-M1 | Water Conservation in County Operations | Very Low | Supporting Measure | | Supporting Measure | Supporting Measure | |
| Total GHG Reduction Water Conservation Measures | | | 8,560 | | 8,560 | 8,560 | |
| Total GHG Reductions | | | 76,450 | 56,280 | 24,380 | 67,980 | 47,060 |
| Total Remaining Emissions | | | 839,710 | 859,880 | 891,780 | 848,180 | 869,100 |
| Reduction from Baseline with County Reductions Only | | | 12.6% | 10.5% | 7.2% | 11.7% | 9.5% |
| Statewide Reductions | | | | | | | |
| Pavley | 98,280 | | | | | | |
| LCFS | 32,160 | | | | | | |
| Total Reductions | 130,440 | | 206,890 | 186,720 | 154,820 | 198,420 | 177,500 |
| Total Remaining Emissions | | | 709,270 | 729,440 | 761,340 | 717,740 | 738,660 |
| Total Reductions from Baseline with County and Statewide Reductions | | | 26.2% | 24.1% | 20.8% | 25.3% | 23.1% |

## COSTS AND SAVINGS

Each recommended measure is accompanied by an analysis of costs. A summary of this analysis can be found for each measure recommended in Chapter 3, *Emission Reduction Measures and Actions*. Background information underlying anticipated costs is provided in Appendix C, *Cost Analysis Methods*.

The distribution of costs over time varies among the recommended measures. Some measures require only funding from the County or other public entities, whereas others require that residents, farmers and businesses contribute. In nearly all measures that require some private sector investment, there are long-term savings that will allow recuperation of initial investments. Other co-benefits such as improved air quality or public spaces are also anticipated. Some measures require little or no private investment, but have potential to generate long-term savings for residents, farmers or business owners.

## FUNDING STRATEGY

This section describes potential funding sources and financing that Solano County could pursue to offset the financial burden of implementing the CAP.

The spectrum of public and private funding options for recommended measures is ever-evolving. This section outlines viable funding options that are current to the CAP, but will eventually become out of date. However, there are general sources of funding that provide the most up-to-date information possible, including:

- U. S. Department of Energy (DOE)
- California Energy Commission (CEC)
- California Infrastructure and Economic Development Bank
- Metropolitan Transportation Commission
- Association of Bay Area Governments
- Pacific Gas & Electric (PG&E)

Interagency collaboration is critical to success. Strategic public funding by the County, regional government agencies, and the State for capital projects, incentives, outreach/education, and new legislation will be required to achieve CAP objectives. To decrease costs and improve the plan's efficiency, actions should be pursued concurrently whenever possible.

Funding sources have not been identified for each action. However, numerous federal, State, and regional grants are available. Additionally, Solano County should partner with nearby cities and jurisdictions to administer joint programs when feasible. As many businesses in the Bay Area and Sacramento are leaders in resource efficiency, renewable energy, and green infrastructure, many public-private partnership opportunities exist that can decrease implementation costs. Many of the measures and actions have potential to be self-financing if properly designed and implemented.

### State and Regional Grants

Many State and regional grant programs are available to fund transportation and infrastructure improvements. The programs listed below represent the current status of the most relevant of these programs. The City should evaluate the current status of these programs before seeking funding, as availability and application processes are routinely updated.

**Energy Upgrade California:** Energy Upgrade California™ is an unprecedented alliance among California counties, cities, non-profit organizations, the state's investor-owned utilities (Pacific Gas and Electric, Southern California Edison, Southern California Gas Company, and San Diego Gas &

Electric Company), and publicly owned utilities. Funding for this effort comes from the American Recovery and Reinvestment Act (ARRA, also known as federal stimulus funds), California utility ratepayers, and private contributions. Energy upgrade rebates are administered by participating utilities.

**California Energy Commission Energy Efficiency Financing.** The CEC offers low-interest loans for public institutions to finance energy-efficient projects and programs. Interest rates are currently at between 1 and 3%. Projects with proven energy and/or capacity savings are eligible, provided they meet the eligibility requirements for Energy Conservation Assistance Account (ECAA) loans. Examples of projects include:

- Lighting systems
- Pumps and motors
- Light emitting diode (LED) streetlights and traffic signals
- Automated energy management systems/controls
- Building insulation
- Renewable energy generation and combined heat and power projects
- Heating and air conditioning modifications
- Wastewater treatment equipment

At the time of this writing, the CEC Energy Efficiency Financing program is closed due to oversubscription of funds. No date has been established for reinstituting the program.

**California Comprehensive Residential Building Retrofit Program.** The California Comprehensive Residential Building Retrofit Program is a program under the State Energy Program (SEP) administered by the CEC to create jobs and stimulate the economy through a comprehensive program to implement energy retrofits in existing residential buildings. The Program focuses on deploying re-trained construction workers and contractors, and youth entering the job market to improve the energy efficiency and comfort of California's existing housing, creating a sustainable energy workforce in the process.

### Public-Private Partnerships

The Bay Area and Sacramento are home to numerous private companies who provide renewable energy or green infrastructure. The success of the CAP depends in part on collaboration between these businesses and the City and public. PG&E administers numerous energy efficiency programs that the County can leverage and help advertise to residents. Solar companies will also be an important asset to the CAP, as the advent of the Power Purchase Agreement (PPA) enables businesses, residents, and the County to install solar panels and access solar power at no cost. Partnering with these businesses enables the County to save money and to provide the community with green infrastructure.

**Power Purchase Agreements.** Renewable energy has become increasingly more accessible and cost-effective due to PPAs. In a PPA, a private company or third party installs a renewable energy technology, often solar panels, at no cost to the consumer and maintains ownership of the installed panels, selling customers the power produced on a per kilowatt-hour basis at a contractually-established rate. The rate is lower than what customers pay their utility today, and increases at a fixed annual percentage (usually 2.5 to 4.0 %) which is typically lower than utility rate escalation. In addition to installing the panels, the third party monitors and maintains the systems to ensure

functionality. The contract period for a PPA is typically 15 years, at which point the third party will either uninstall the panels or sign a new agreement with the building owner. These agreements are ideal for demonstration projects implemented by the City and residents or businesses.

**Energy Service Performance Contracts.** Energy service performance contracts are a common way to provide financing for equipment necessary to complete energy efficiency improvements. An energy service performance contract would be an agreement between Solano County and an energy service company. The energy service company would implement a renewable energy or energy efficiency program and guarantee that the energy savings will meet or exceed annual payments to cover all project costs. Typical projects include:

- Lighting
- Heating, ventilation and air conditioning (HVAC)
- Control systems
- Building envelope improvements (e.g., insulation)
- Cogeneration and combined heat and power
- Demand response
- Renewables and biomass
- Water and sewer (metering and use reduction)
- Sustainable materials and operations

**Energy Savings Performance Contracts.** Under an energy savings performance contract, an energy services company guarantees the amount of energy saved, and further guarantees that the value of that energy is sufficient to make the debt service payments as long as the price of energy does not fall below a stipulated price floor. Typically, an energy savings performance contract would have a simple payback of 10 years or less to allow for the cost of money and other fees to be included in the overall project payback. Lending institutions often look for less than 15 years including all fees. Typical projects include:

- Energy management systems
- Interior and exterior lighting
- Boiler replacement/repair of steam systems
- High-efficiency HVAC systems
- LED traffic systems
- Wastewater treatment plant pumps and motors

**On-Bill Financing.** By partnering with PG&E, Solano County could facilitate the repayment of loans for efficiency upgrades on utility bills. PG&E is in the process of implementing a pilot on-bill financing program for small businesses. The system could function using either loans or tariffs. A loan is assigned directly to the customer who must pay it back even if he or she moves. In contrast, the tariff approach links the charge to the meter, meaning that whoever lives at the house or owns the business pays the fee. If the customer moves, the new occupant picks up the payment. The tariff approach allows for a long payment term and therefore lower monthly costs. It also encourages renters to participate in the program because they only pay for energy saving measures while they benefit from them, and remain in the premises.

Upgrades would be selected by the building owner (in coordination with the County) such that the efficiency savings would pay for the investment over a fixed period of time. Customers would "share" monthly energy efficiency savings with the utility until the loan is paid back, at which point all savings would be reflected in lower monthly bills.

**Energy Efficiency Mortgages.** Energy Efficiency Mortgages provide owners additional financing (whether at time-of-sale or upon refinancing) for energy efficiency improvements at discounted interest rates. Energy efficiency upgrades could be chosen that would allow owners to realize a net monthly savings. The goal is to provide capital for energy efficiency upgrades at a discounted interest rate.

The Federal Housing Administration (FHA) offers an Energy Efficient Mortgage Loan program that helps current or potential homeowners lower their utility bills by enabling them to incorporate the cost of adding energy-efficient improvements into their new home or existing housing.

### Partnerships with Other Jurisdictions and Organizations

Partnering with neighboring jurisdictions is another key implementation strategy Solano County can undertake to support the CAP. Various jurisdictions within and adjacent to the county could serve as potential partners in implementing the CAP strategies.

### Self-Financing Strategies

CAP measures include incentives, as well as regulations or fees, to encourage change in farming, transportation, energy and water use, and solid waste disposal habits. It is important that the fees established in the CAP be self-financing. The money raised through the fees would then be used to implement the CAP measures determined to provide the best mitigation results. Solano County will actively explore opportunities to establish programs that are self-financing, and thus sustainable over the long term.

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## Chapter 3: Emission Reduction Measures and Actions

### Energy and Efficiency


i. Pacific Gas and Electric (PG&E) is currently the County's energy utility. In 2007 renewable energy facilities including solar, geothermal, and biomass provided 14% of the total supply. Hydroelectric generation provided 18% and nuclear plants provided 23%. Natural gas facilities provided 42% and coal provided three percent.

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## APPENDICES

### Appendix A


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## Appendix B


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## Appendix D


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RIO DE LOS PUTOS
WINTERS
RANCHO RIO DE LOS PUTOS
RANCHO
SUISUN
SILVEYVILLE
DIXON
CEMETERY
BATAVIA
VACAVILLE
VACA STA.
ELMIRA
CEMETERY
BINGHAMTON
Alamo Cr.
Ulatis Creek
LOS PUTOS
VACA VALLEY RAILROAD
PLEASANTS VALLEY
BLUE MOUNT
MT. VACA
HINCLAY
LAGOON VALLEY
VACAVILLE ROAD
CANON STATION
CAL. PAC. R.R.
MAINE PRAIRIE
MAINE PRAIRIE
SOUNDS SLOUGH
CACHE SLOUGH
LINDA SLOUGH
PROSPECT SLOUGH
TRAPPER SLOUGH
NEWCASTLE
SUISUN GRANT
SUISUN GRANT
SUISUN
FAIRFIELD
COUNTY SEAT
HOSPITAL
CEMETERY
ROCKVILLE
DENVERTON ROAD
DENVERTON
LANDING
MOUNT DIABLO MERIDIAN
BRIDGEPORT
LANDING
POTRERO HILLS
SUISUN SLOUGH
JOICE ISLAND
MONTEZUMA SLOUGH
NURSE SLOUGH
GRISLY ISLAND
GRISLY ISLAND
MEINS LANDING
BIRDS LANDING
POST OFFICE
BIRDS LANDING
MONTEZUMA
MONTEZUMA HILLS
LOS ULPINOS GRANT
NEWTOWN LAND
SUISUN BAY
HAMMOND I.
RICHS I.
ROARING RIVER
WHEELER I.
LONG POINT
HOWE I.
HOWE BAY
COLLINSVILLE
VAN SICKLES
CHIPPS I.
ARSENAL
ICELAND
SACRAMENTO
RIVER